3-3-4 Outline of Facilities and Equipment

(1) Facilities

The outline of the facilities for the CH-11 project is as follows:

1)	Location	a site on New Petch Buri Road	
2)	Building	Floor area	- 2,797m²
		Storey	- 2 storeys
		Structure	- RC
		Studio	- Production Studio (300m²)
			News Studio (50m²)
			Dubbing Studio (30m²)

3) Transmitting Tower

Self-supporting, steel tower (180m in height)

(2) Broadcasting equipment

1) Transmitting system

Transmitting System	a	20 kw VHF TV Transmitter (one 20 kw: Standby)	2
	b	TV Transmitting Antenna	1
	c	Dehydrator	1
	d	Self-supporting Tower (180 m)	1

2) Program Transmission Link

Program Transmission Link	a	Micro Wave Link (one way)	1
	b	Parabolic Antenna	2

3) TV News Studio

TV News Studio	a	Color Camera	2
	b	Video Control Equipment	1
	c	Audio Control Equipment	1
	d	Monitor Equipment	1
	e	Lighting System	1

4) Master Control

Master Control	a	Synchronizing Signal Generator (Hot-Standby)	2
	b	Master Control Switcher	1
	c	Monitor Equipment	1
	d	Clock System	1
	e	Room to Room Intercom	1

5) Video Recording-Playback System

Video Recording-Playback System	a	Recording Playback VTR	1
		1 inch Type-C VTR	3
		3/4 inch Umatic VTR	4
	b	Telecine Chain	1
	c	Monitor Equipment	1

6) VTR Editing Equipment

VTR Editing Equipment	a	Umatic Recording-Playback VTR	1
	b	VTR Editor	1
	c	Monitor Equipment	1

7) Dubbing Studio

Dubbing Studio	a	Audio Control Equipment	1
	b	Umatic Recording-Playback VTR	1
	c	Television Standard Converter	1
	d	Monitor Equipment	1

8) Production Studio

Production Studio	a	Color Camera	3
	b	Video Control Equipment	1
	c	Audio Control Equipment	1
	d	Monitor Equipment	1
	e	Lighting System	1

9) OB Van (outside Broadcasting Van)

OB Van	a	Color Camera	2
	b	Video Control Equipment	1
	c	Audio Control Equipment	1
	d	Monitor Equipment	1
	e	Synchronizing Signal Generator	1
	f	Recording-Playback VTR (Umatic)	1
	g	EPU Equipment	1 pair
	h	Telecommunication Equipment	1 pair
	i	Vehicle	1

10) Measuring Equipment

Measuring Equipment	a	For Transmission	1 set
	b	For Video Signal	1 set
	c	For Audio Signal	1 set
	d	For Lighting	1 set

3-3-5 Project Management Plan and Personnel Formation

(1) Administrative System

PRD has already selected a staff of 65 to operate the CH-11 experi mental station. The CH-11's personnel formation to be realized 3 to 4 years after completion of this project will be as shown in the table below.

Table 3 CH-11 Personnel Plan

Department	Manager	Staff	Total
Director	1	-	1
Deputy director	1	-	1
Administration	1	27	28
News	1	55	56
Program	1	35	36
Art work design	1	14	15
Engineering	1	46	47
Total	7	177	184

The CH-11 station, with this personnel formation, will produce and broadcast news, public information and educational programs by the use of the transmitting equipment which covers the prescribed service area.

(2) Operating Expenses Plan

As a result of the Thai Government's decision at the Cabinet meeting held on May 6, 1986, the CH-11 station was designated to be operated as a national television broadcasting station which does not accept any commercial. Therefore, the station's source of revenew is primarily the airtime charge to be collected from the users of its educational programs such as STOU.

The operating expenses estimated by PRD is as shown below.

Income

The target income for the initial two years was calculated as follows:

Given the airtime charge of 15,400 B/hr. and 10 broadcast hours a day, the total annual income = 15,400(B) x 10 x 365 = 56,210,000(B).

Expenditure

25% of the airtime charge returned to the Government	14,052,500
Program production expenses	11,000,000
Materials expenses	4,000,000
Maintenance expenses	4,000,000
Heating and lighting expenses	10,000,000
Facilities and equipment consumption expenses	6,000,000
Miscellaneous expenses	4,905,250
Total	53,957,750

Since it is expected that the expenditure will not exceed the target income and the unit airtime charge of 15,400 B/hr is far cheaper than other stations' charges ranging from 22,000 B/hr to 25,000 B/hr, the CH-11's operating expenses plan will be executed very smoothly.

As regards return of 25% of the income from airtime charge to the Government, this is a system peculiar to the Thai's national broadcasting system. Thus, this procedure will be applied to the CH-11 station as well as to the other regional centers.

According to the explanation by PRD, the amount returned to the Government will cover the personnel expenses of the total Thai national television organization.

3-4 Technical Cooperation

In order to carry through the project, the Government of Thailand requested the Government of Japan to extend technical cooperation in two forms; namely, dispatch of experts on long-term assignments and provision of training in Japan to the Thai project staff.

The contents of the technical cooperation requested are as follows:

(1) Training program in Japan

		person	duration (month)
a.	General TV broadcasting engineer	4	2
b.	TV work-site operator	4	1
c.	Measurement and maintenance engineer	4	1
d.	Program production engineer	6	1
e.	Broadcasting administrative engineer	4	1
f.	News production engineer	6	3/4
	Total	28	

(2) Expert assignment

a.	Expert in program production engineering	1 person	1 year
b.	Expert in program production	1 person	1 yaer

CHAPTER 4 BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4-1 Design Guidelines

(1) Architectural Design Guidelines

By definition the CH-11 station must fulfill its social responsibility by broadcasting news on emergencies such as disasters in addition to educational programs. In view of the fact that television broadcasting services are very likely to be greatly affected by the advance of modern science and technology, it is essential to design its facilities in a manner that will make them flexible enough to adapt to the future changes in the station's social function. Thus the following should be the architectural design guidelines in designing the station's facilities.

1) Facilities capable of functioning well in cases of emergencies

To maintain secure function should be the primary consideration in designing the facilities so that the station can efficiently broadcast news in cases of emergencies such as disasters.

2) Facilities capable of adapting to the future innovations in broadcasting technology

a) In determining the spatial allocation, ample room should be left for additional installation of new electronic equipment.

b) In calculating the floor load, the future need to rearrange equipment and install additional equipment should be taken into account.

c) Complicated architectural design should be avoided in order to make it easy to maintain the facilities.

3) Facilities capable of adapting to need for future expansion

It is essential to design the facilities so that they may be able to

adapt to any spatial demand for future expansion may occur without their function being impaired by such expansion construction.

4) Studios' sound proofing

In addition to due consideration to be given to sound proofing in structural and equipment design, special attention should be given to location of studios and provision of sound insulating doors. Also sound insulation at doorways should be taken into account.

5) Foundation work to cope with the soft soil and the possible land subsidence

a) The results of the boring test conducted on the project site show that the soil formation is similar to that of Bangkok City. It is therefore necessary to employ the pile foundation generally used in Thailand for this project.

b) It is necessary to work out a structural design that will protect the facilities from possible uneven land subsidence.

6) Architectural design program best suited for Thailand's weather and climate

a) It is essential to work out an architectural design program which will make the building well ventilated, shaded and sound insulated, in view of the characteristics of Thailand's tropical monsoon climate -- strong sunlight, high temperature with high humidity.

b) It is necessary to select the most appropriate method for water proofing the building so that it may stand for heavy rainfalls in the rainy season (May - November).

c) In the architectural design the first floor level should be set higher than the ground level so that the buildings may not be damaged by floods. The buildings should have no basement.

(2) Design Policy of Broadcasting Equipment

In designing of the broadcasting equipment, the following matters should be the basic policy:

1) Careful consideration and study shall be made so that the equipment can achieve the purposes of the project most rationally and effectively, and so as to gain the maximum result within the scope of assistance as well.

2) In the designing of equipment, easiness and economy of operation, maintenance and management shall be fully taken into consideration so as to cope easily with the future expansion as system and introduction of new technology.

In addition, these equipment shall be arranged on the second floor as practically as possible so as to protect the broadcasting equipment from flooding due to heavy rain.

3) Specifications for equipment shall be in conformity with the technical standard of CCIR (International Radio Consultative Committee), and the equipment shall be designed by paying much attention to rigidity as well as electric and mechanical stability. Particular attention shall be paid to operability, credibility and economy. In addition, to make supply of spare parts easier and make maintenance and management more effective, cameras and VTRs shall be unified with the same type equipment as much as possible, thus enhancing their interchangeability at the same time.

4) Technical Standard

a) Television standard CCIR B system

b) Color system PAL system

4-2 Natural and Environmental Conditions

(1) Natural Conditions

1) Climate

Thailand's climate belongs to the tropical monsoon climate. Its weather conditions are as shown in Tables 4 and 5.

Table 4 Average Annual Temperature, Average Annual Precipitation and Average Annual Humidity in Bangkok (1980)

Place	Temperature (°C) Maximum	Minimum	Average (annual)	Average annual precipitation (mm)	Average annual humidity (%)
Bangkok	33.7	24.7	28.5	1,471	74.7

(Source: Statistics Bureau)

Table 5 Average Monthly Temperature in Bangkok (°C)

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
26.1	27.6	29.2	30.3	29.8	28.9	28.4	28.2	27.9	27.6	26.7	25.5

(Source: Statistics Bureau)

As can be seen from these tables, Thailand has a climate of high temperature with high humidity throughout the year. It is necessary therefore to design facilities with comfortable working conditions.

Accordingly, it is essential to have private rooms and passageways installed with large windows on two sides so that they may be able to acquire natural ventilation. As measures to cope with heavy rainfalls, the roofs and eaves should be well water-proofed and the roofs should have a steep slope. The drainage route around the site should be designed as simple as possible so that rainwater may be diked as quickly as possible.

In Thailand, a year is divided into the rainy season (May - November) and the dry season (December - April). In the rainy season a sudden shower falls for an hour or two every day. In addition many ditches in Bangkok have recently been filled in. As a result, the streets in Bangkok are often flooded when a sudden shower comes.

Therefore, it is essential to set the first floor level higher than the ground level by 1 to 1.5 m. It is also necessary to install the air conditioning and program delivery equipment at the second floor wherever possible.

2) Land subsidence

Land subsidence is a serious problem in Thailand. The soil of the Bangkok metropolitan area, which is located in a large alluvial plain, is very soft. In recent years, a large quantity of ground water has been pumped up in keeping with the area's industrialization. As a result, the area is now suffering from a large land subsidence (average annual land subsidence of 10 - 40 mm). For this reason, it is necessary to set the column span as even as possible to ensure balanced distribution of load. Furthermore, it is necessary to make scarcements and terraces structurally different from the building so that the building may stand for land subsidence.

3) Architectural design to cope with squalls

In the rainy season Bangkok is often hit by a squall. So it is necessary to make the roofs and eaves have an appropriate angle to stand for the squall and control the dimension of openings in the building.

(2) Existing Situation of the Infrastructure in and around the Project Site

1) Electricity

In Bangkok electricity is supplied by The Metropolitan Electricity Authority (MEA).

The voltage is 380 V for industrial use and 220 V for house-hold use. Voltage fluctuation often occurs.

The frequency is 50 Hz.

2) Telephone

There are perennial shortages of telephone circuits in Bangkok. Since the designated number of telephone circuit may not readily be available, it is desirable to design the telephone facilities equipped with minimum number of circuits and maximum number of terminals.

3) Water supply

Potable water supply is available in almost all districts within Bangkok.

Although the quality of water at the source is high, piped water is so low because the water main is often cut or leaks due to uneven land subsidence and corrosion. Thus city water is used mainly for cleaning toilets and hands. Potable water is purchased. An elevated water tank is required to maintain necessary water supply pressure, but shall be made of thermal insulating materials.

4) Sewerage

Sewerage pipes are installed in almost all districts within Bangkok, but are not drained so well. It is necessary therefore to design the sewerage system in a manner that will facilitate drainage.

In this project human waste is to be treated inside septic tanks.

4-3 Basic Plan

4-3-1 Determination of Project Scale

(1) Determination of Architectural Scale.

The architectural scale was determined on the basis of the floor area necessary for the transmitting and program production equipment, while taking due consideration of PRD's personnel formation plan and desirable scale of common spaces, as shown in Table 6.

The floor area necessary for the personnel was determined on the basis of PRD's personnel formation plan as shown below.

PRD's Personnel Formation Plan

a. Director	1
b. Deputy director	1
c. Administration manager	1
Administrative staff	27
d. News manager	1
News staff	55
e. Program manager	1
Program staff	35
f. Art manager	1
Art staff	14
g. Engineering manager	1
Engineering staff	46
Total	184

If it is assumed that the administrative staff will occupy the existing building, the necessary floor area will be 5 m^2 (per capita) x 29 = 145 m^2 (including the floor area for Deputy Director).

The existing 4-storied building contains usable office space of about 100 m^2 on the second floor and that of about 160 m^2 on the third floor. Thus it is possible for the administrative staff to utilize these office spaces.

The other usable space (260 - 145=115 m²) is divided into a 60 m² room and two 30 m² rooms, all of which are currently used for training. These rooms can be used for the same purpose in the future.

Thus the optimal scale of the personnel is 155 (184-29).

The number of staff members (excluding Director and Managers) is 150. Then the necessary floor area for them is 750 m² (5m² x 150). In actuality, however, the staff members will be divided into those who require desks for exclusive use and those who will work in three shifts. The ratio of the former to the latter will be approximately 1:2 on the result of case analysis of CH-3 and CH-9 stations.

Thus those staff members who will require desk for exclusive use will number 50 and the others approximately 100.

Then, it follows that the floor area necessary for those staff members who will require desks for exclusive use is 250 m² (5 m² x 50). Those who will work in three shifts will use common desks. If it is assumed that they will require 3 m² per capita, the floor area necessary for them is 200 m² (3 m² x 2/3 x 100). Thus, the remaining floor area necessary for the staff members is: (5 m² x 50) + (3 m² x 2/3 x 100)=450 m²

Table 6 Area Requirement

SECTION	ROOM	AREA (m^2)
TRANSMITTING FACILITIES	TRANSMITTER'S ROOM	52
	AIR-SUPPLYING ROOM	10
	AIR-CHAMBER	10
	SUB-TOTAL	72
NEWS STUDIO	STUDIO	48
	SUB-CONTROL ROOM	38
	STORAGE	26
	SCENERY ROOM	9
	SOUND LOCK	6
	SUB-TOTAL	127
MASTER CONTROL	MASTER CONTROL ROOM	36
VTR/TELECINE	VTR/TELECINE ROOM	54
	VTR EDITING ROOM	18
	SUB-TOTAL	72
DUBBING	STUDIO	30
	SUB-CONTROL	36
	SUB-TOTAL	66
DATA	VTR AND FILM STORAGE	36
PRODUCTION STUDIO	STUDIO	300
	SUB-CONTROL ROOM	48
	TRANSFORMER AND DIMMER ROOM	15
	STORAGE	25
	DRESSING ROOM (MEN)	13
	DRESSING ROOM (WOMEN)	13
	MAKE-UP ROOM	33
	SCENERY ROOM	123
	PROPERTY ROOM	22
	COSTUME STORAGE	26
	SOUND LOCK ROOM	6
	SUB-TOTAL	624
REHEARSAL	REHEARSAL ROOM	51
	STORAGE	91
	SUB-TOTAL	60

SECTION	ROOM	AREA (m²)	
OUTSIDE BROADCASTING (O.B.)	O.B. PREPARATION ROOM		51
CONFERENCE	CONFERENCE ROOM	36	
	SMALL CONFERENCE ROOM	24	
	SUB-TOTAL		60
EXHIBITION	EXHIBITION LOBBY		56
DIRECTOR	DIRECTOR'S ROOM		25
STAFF	OFFICE		438
MECHANICAL	AIR CONDITIONING EQUIPMENT ROOM 1	87	
	AIR CONDITIONING EQUIPMENT ROOM 2	21	
	ELECTRICAL EQUIPMENT ROOM	36	
	SUB-TOTAL		144
COMMON AREA	ENTRANCE HALL	72	
	STAFF LOBBY	18	
	CORRIDOR	679	
	KITCHENETTE	24	
	REST ROOM	110	
	STORAGE	27	
	SUB-TOTAL		930
TOTAL			2,797

(2) Scale of Broadcasting System

1) Transmitting Equipment

The service area of a broadcasting station depends on the height of an antenna tower, antenna gain and its power distribution ratio, transmitter's output, terrain, etc., thus it is required to make up the most efficient transmission system by studying these factors carefully and then making the most suitable design.

As the result of the study of the request, the service area for CH-11 has been set to cover the area of 95 km in radius from the transmitting point. And the population within this service area is estimated about 14 million.

Composition of antenna, transmitter's output and the tower height to secure this service area are as follows:

(a) Composition of Transmitting Antenna

As the number of antennas increases, electromagnetic wave reaches further (i.e. service area can be broadened) but, this generates an electrically very weak zone (null point) close to the antenna. In case of CH-11 of which transmitting station is located in the center of the city, this zone will be produced where lots of viewers live, thus making inconvenience. In order to cope with this, 4 dipole pannel antenna which has high transmitting efficiency and is widely used as a transmitting antenna of VHF television should be employed, and the number per face should be 8.

In addition, the necessary service area should be secured efficiently in design by employing an appropriate power distribution taking account of the terrain in the service area, for example, by restraining the radiating power toward the Gulf of Thailand (south side) and increasing the radiating power toward the east, west and north regions.

(b) Transmitter's Output

Reviewing together with the above service area secured and conditions of the antenna composition stated in the above (a), the transmitter's power will range from 10 kw to 40 kw, and thus 10 kw, 20 kw or 40 kw can be a possible power. A very high tower will be required for securing the same service area as CH-9 (20 kw by two 10 kw transmitters operated in parallel) in case of 10 kw, which will make a tower very expensive. This invites irrationality in design.

As for 40 kw, the electric power consumption increases and so does the operating cost. It is estimated that an increase, compared with the case of 20 kw output, will amount to approximately 8 million yen annually. Therefore, 20 kw is best to employ.

In view of the transmitter's composition, credibility of the transmitter is low because of vacuum tube used in its output final stage, compared with other equipment which are all semiconductorized. And it requires certain time to replace the vacuum tube and then to adjust the equipment, thus necessitating a standby equipment in some way. Taking account of type and method of the transmitting system having 20 kw output with a standby equipment, 2 systems can be considered; one is to adopt 2 transmitters of 10 km each operated in parallel (in case of failure of one transmitter, which should be shut off and then the output circuit is switched to another transmitter, thus initiating operation again with 10 kw output) of which system is employed by CH-9 station.

The other system considered is to install two 20 kW transmitters, one for hot and the other for standby. Demerits of the former are that the output becomes one-half when one of them breaks, and the output circuit becomes very complicated. The latter, however, is simple to operate and does not generate a

decrease in power because a standby equipment is automatically changed over when either one of them failed. In this project, the latter system of two 20 kw (one for hot and the other for standby) should be employed.

(c) Antenna Tower

With the assumption made from the conditions of the above (a) and (b), the service area can be calculated as follows in case that the tower is 250 m, 180 m, 150 m and 100 m high:

Height of Tower	Radius of Service Area
250 m	103 km
180 m	95 km
150 m	91 m
100 m	81 km

In order to secure the same service area as CH-9 (95 km in radius), the tower should be 180 m high.
(If other conditions remain unchanged and if just the number of antennas, i.e. 8 stacks of present design is reduced to 6 stacks, the same with CH-9, the service area will be decreased to about 90 km in radius.)

Tower structure can be divided into two types; guyed tower and self-supporting tower. With a guyed tower employed, the height will be restricted to less than 130 m high because of the restricted compound of CH-11. With this height, it is not possible to secure the same service area as CH-9, hence a 180 m high self-supporting tower should be employed.

2) Program Transmission Equipment

In order to transmit the news and other programs produced by CH-11 to each regional center of PRD through the nationwide microwave network of TOT, 1 pair of transmitting and receiving microwave link should be installed between CH-11 station and TOT Bangkok Terminal Station.

The transmitting equipment should be installed at CH-11 station and the receiving equipment should be located at TOT Bangkok Terminal Station. The transmitting parabolic antenna should be fixed to the tower constructed under this plan and the parabolic antenna for receiving to the existing tower of TOT Terminal Station.

3) Program Production and Sending Equipment

(a) News Studio

In order to produce and send the news programs televised 5 times a day which are incorporated into the program transmission table, a specific news studio should be installed.

In this project, a standard type of news program production in this studio should be set as follows as design standard:

Multiple announcers (or news casters) sit at a front table and announce in the form of a talk show.

Cyclorama (note 1) or simple setting should be provided behind the announcers and it should be possible to make chromakey back (note 2) by lighting.

By placing a panel in addition to the cyclorama, a commentator can do his job standing beside the panel.

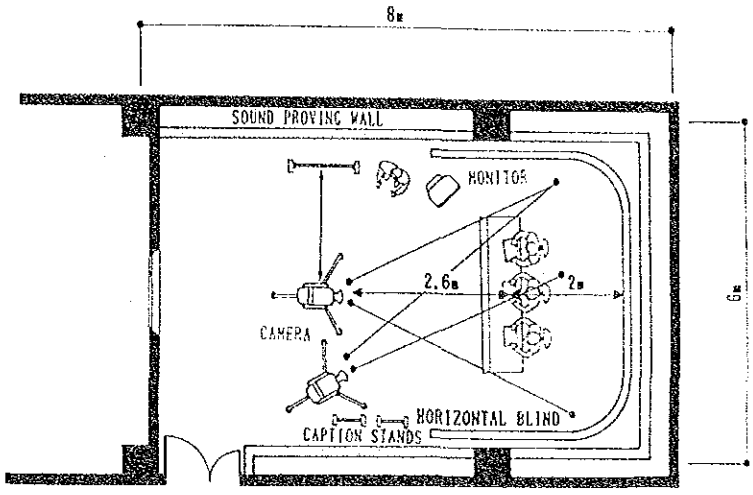
One or two caption stands to place still pictures or charts should be placed at the corner of the studio.

Note 1 cyclorama: a panorama type curtain placed behind persons

Note 2 chromakey back: Colors are optically applied to the cyclorama to combine more than two types video signals electrically.

In addition to the above standard, the design should be made based on program production to insert VTR materials recorded in the field. To realize this, about a 50 m^2 floor is required.

Fig. 8 Equipment Layout-News Studio



(b) Master Control

As for the equipment in a master control room to be as the core broadcasting equipment of CH-11, the transmission switching equipment, synchronizing signal generator, monitor equipment, television standard converter, etc., should be mainly installed.

Transmission switching equipment include news studio, production studio, playback VTR, telecine chain, OB Van, etc., as inputs, and to CH-11 transmitter and TOT Bangkok Terminal Station as outputs. Design should be made so that these inputs and outputs can be smoothly and accurately switched according to the program transmission table.

The synchronizing signal generator is an important device to control the video equipment in all of the station centrally, thus two set system, one for hot and the other for standby, should be employed. In addition, they should be so constructed as to be instantly and automatically switched if the equipment in use become out of order.

If a television standard converter is placed in the dubbing studio, the converter's input connection will be only available to the equipment in the dubbing studio, thus scope for use and availability will be restricted. To avoid this inconvenience, the converter should be installed in the master control room where input and output of all the broadcasting equipment are functionally concentrated.

In addition, a clock system and a master equipment for room to room intercom which are essential as broadcasting station should be provided.

(c) Video Recording-Playback System

A variety of functions are required for this equipment such as the studio production, recording of outside production programs, playback insertion to the studio, and playback and sending various education and culture programs produced by CH-11 and provided by outside users in addition to STOU. VTRs (3 sets of 1-inch type and 4 sets of 3/4 - inch Umatic type) and a set of telecine chain capable of coping with the above requirements should be centralized in one room.

In order to fullfil these purposes at the same time, an assignment switcher for input and output switching and a monitor equipment should be provided so that the connection with the master control room can be made smoothly as well as without an erroneous handling.

(d) VTR Editing Equipment

Two sets of editing equipment, each consisting of a recording-playback VTR, editor, monitor equipment, etc., should be provided to make one piece of program from various recording tapes such as materials recorded in studio and OB Van, and tapes kept in the tape library, and so forth.

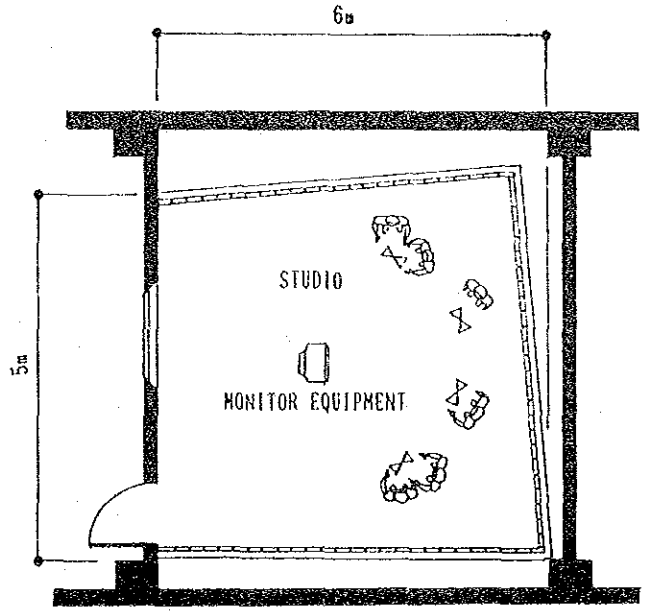
Editing work requires great delicacy and gives the nerves, thus two exclusive editing rooms should be prepared so that the staffers can execute the speedy and accurate editing work without being bothered by circumstances.

(e) Dubbing Studio

A dubbing studio, consisting of an exclusive audio recording studio, audio control equipment, video recording-playback equipment, etc., should be provided to make dubbing in Thai into overseas production programs and make convertion of different standard television signals to the Thai television standard (PAL-B).

Five to six persons or more are required to be in an audio recording studio in case of a drama-type program and when some actions are required for actors when they are making voice-over, thus a dubbing studio should be wide enough to accommodate several stand microphones. In addition, a monitor equipment should also be provided in the studio. In short, the dubbing studio should be as large as a small size talk radio studio in floor area (about 30 m^2).

Fig. 9 Equipment Layout-Dubbing Studio



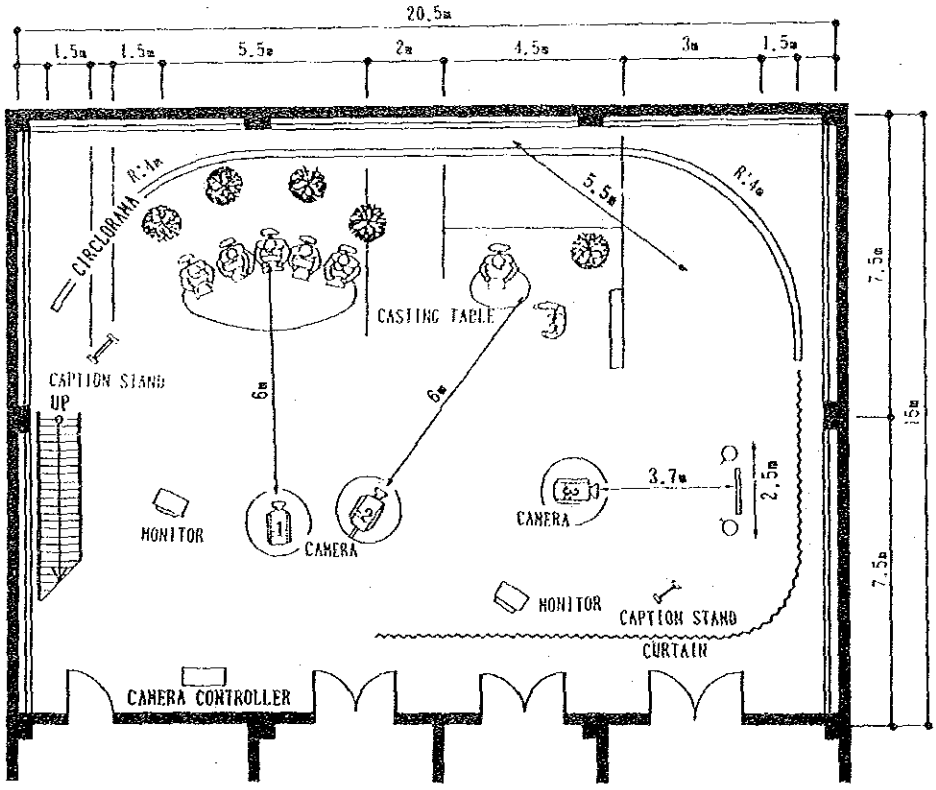
(f) Production Studio

Education and culture programs produced by CH-11 include all types in terms of production such as a face-to-face talk, a round-table talk, music, short hour drama, etc.. A medium size television studio capable of dealing with the above production and direction methods should be prepared.

Floor area should be wide enough so that various medium scale programs can be produced without difficulty, and various equipment should be arranged in there such as color television cameras, various control equipment for video, lighting and audio, video special effect equipment as well as their attachments. Stability of movement and easiness of handling should be emphasized in design while avoiding complexity as much as possible.

Because of a variety of program types, 3 or 4 sets of 5 m x 6 m production set are required, and it is anticipated that cameramen and assistant directors would move widely, thus the floor area of the production studio should be about 300 m².

Fig. 10 Equipment Layout-Production Studio



(g) OB Van (Outside Broadcasting Van)

One compact and fully equipped OB Van with high mobility should be provided for program production outside the studio. Control equipment for camera, video and audio and other equipment should be the same type as those used in the studio as much as possible so as to provide interchangeability and convenience for operation and maintenance.

In addition to the recording equipment, FPU (Field Pickup: portable Micro Wave Link to transmit and receive programmes) should be mounted so as to make live broadcasting and recording long hour programs inside the station possible and to transmit the programs to the studio side. And a radio equipment should be provided to communicate to studios.

Because of a compact vehicle, special attention should be paid to equipment configuration. In other words, design should be made so that these equipment can be efficiently used in view of human engineering, and maintenance and repair can be easily done.

4) Measuring Equipment

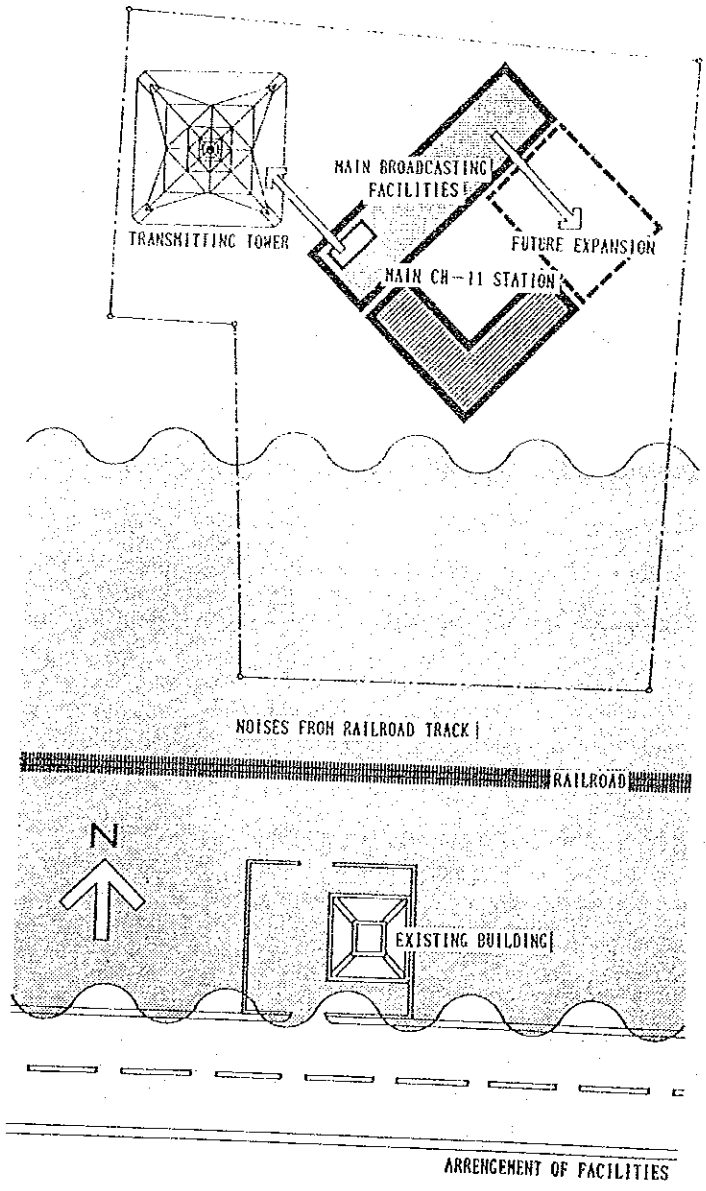
Measuring equipment necessary for measuring video, audio and lighting equipment should be provided to perform repair and management of the broadcasting equipment efficiently and maintain the functions of the equipment. In selecting the equipment, easiness of handling and stability of movement should be taken into consideration.

4-3-2 Arrangement of Facilities on Site

(1) Arrangement of Facilities

1) It is necessary to locate the transmitting tower and the building in the northern corner of the site in view of the irregular shape of the project site, the annoying noises from trains passing through the railroad track adjacent to the site and the possible future expansion of the facilities. Furthermore, the facilities should be broadly divided into the transmitting tower and the station building, and the main broadcasting equipment such as transmitting equipment and studios should be contained within the station building for best efficiency.

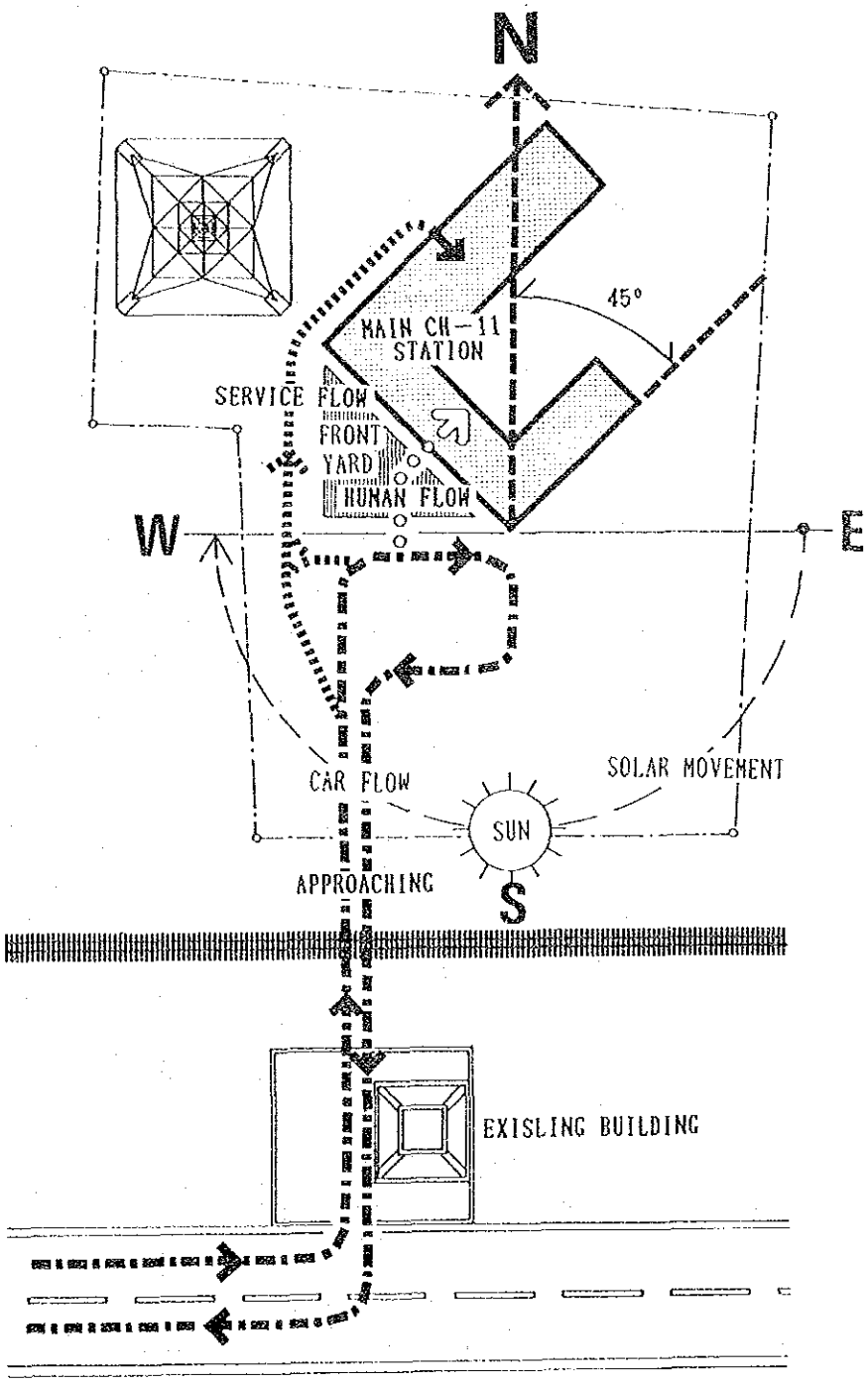
Fig. 11 Arrangement of Facilities



ARRENGEMENT OF FACILITIES

1) In view of the radiant heat on the surface of the walls, the station building will be built along axes at 45 degrees to the north-south axis, thus avoiding direct sunlight from the south and mitigating the load on the air conditioners. A pedestrian deck will be built over the space between the approach road and the station building, which will clearly separate the human flow and the vehicle flow.

Fig. 12 Arrangement of Facilities



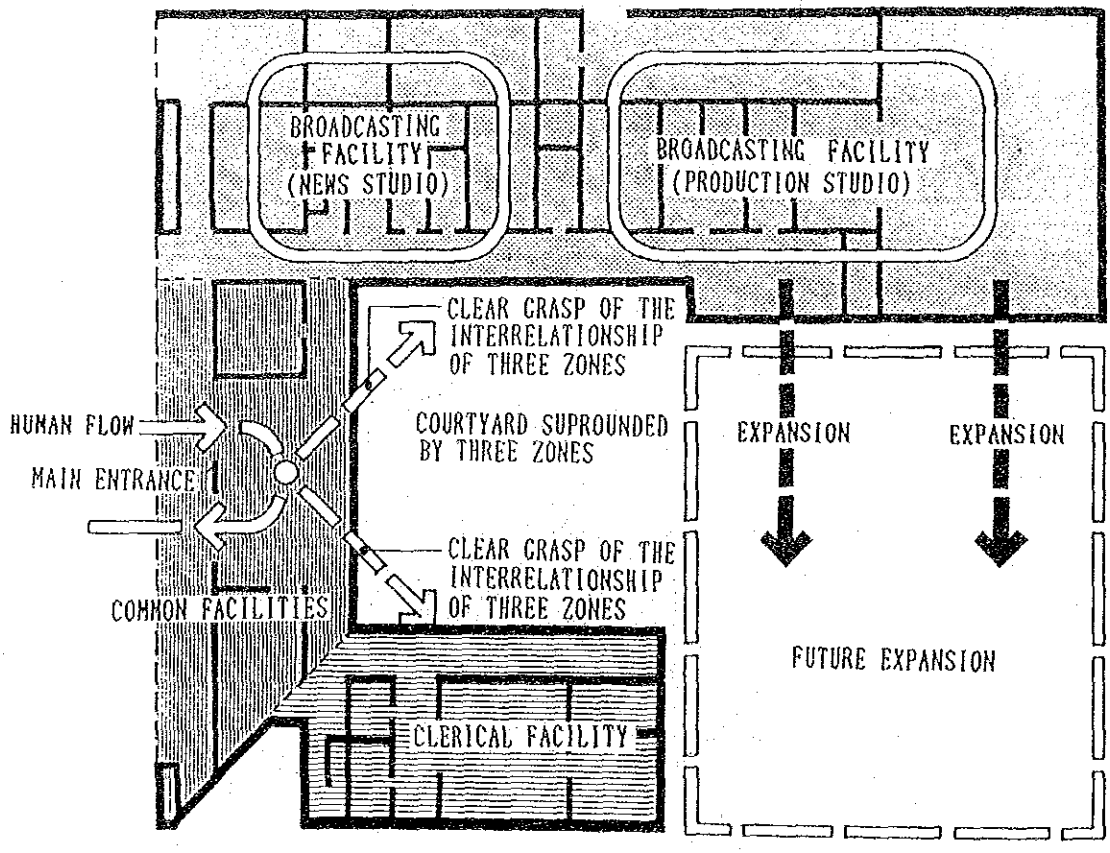
(2) Block Arrangement Plan

Since a television broadcasting station building is one in which various departments interact with one another in very complicated ways and at which many people visit, it is essential to design it in a manner that will allow smooth flow lines. Thus it is desirable to divide the building's floor space into 3 zones -- for broadcasting facilities, clerical facilities and common facilities -- and make each of them spatially and functionally well linked to the others.

If the three zones are arranged in such a manner as they will surround the courtyard, visitors will easily acquire the sense of location and the interrelationship with these three zones.

In anticipation of future expansion, the basic design of the facilities should lead their southward expansion so that their basic function may not be impaired by the expansion work.

Fig. 13 Block Arrangement

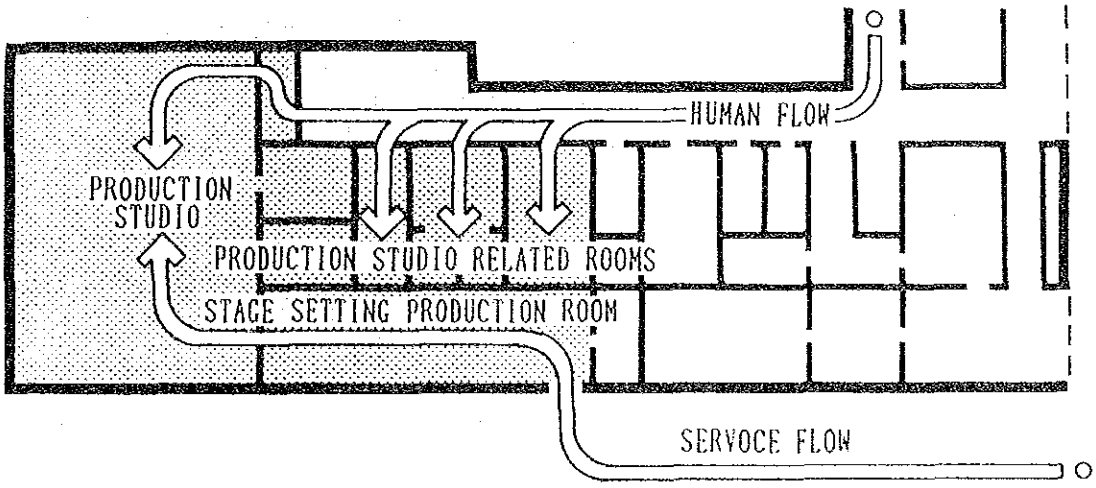


4-3-3 Architectural Plan

(A) Floor Plan

In determining the location of the production studio which is frequented by many visitors, it is desirable to work out for it a flow line different from that in other spaces, and have the studio and related rooms conglomerate a block. Furthermore, it is necessary to provide an independent and direct service flow line to the neighboring stage setting production department. In the ground floor plan, therefore, the studio and related rooms are arranged along the passageway (corridor) facing the courtyard. In this manner, the human flow lines can be simplified and clarified. The stage setting production room is located behind these rooms. Thus all the flow lines -- both for human and service -- are linked direct to the production studio.

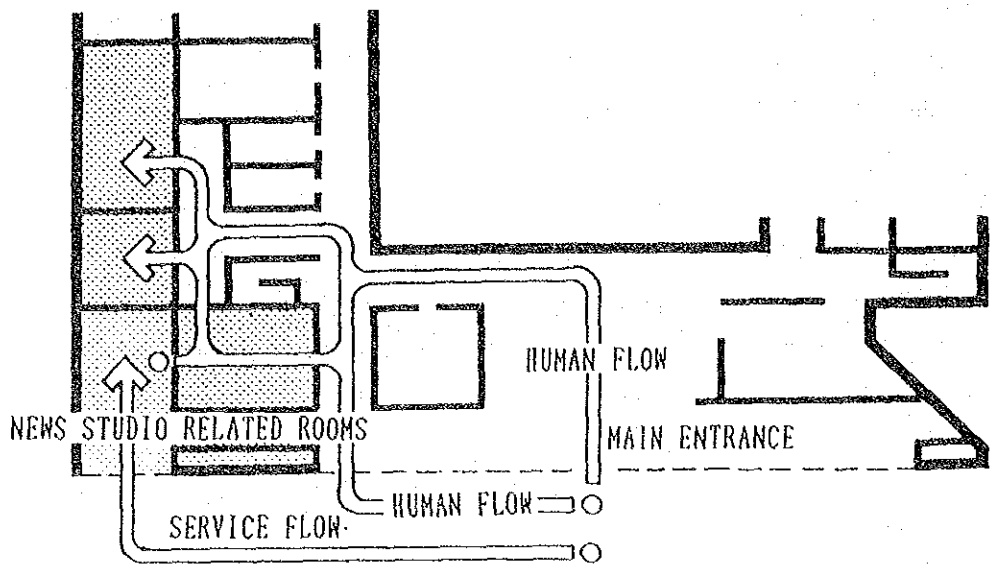
Fig. 14 Ground Plan-Production Studio



The passageways facing the courtyard are considered streets of public nature where visitors can walk through and reach to their designations without interrupting into the staff members' working areas.

All rooms related with the news studio are located near the front entrance of the building. This is because these rooms are frequented by the news staff members.

Fig. 15 Ground Plan-News Studio

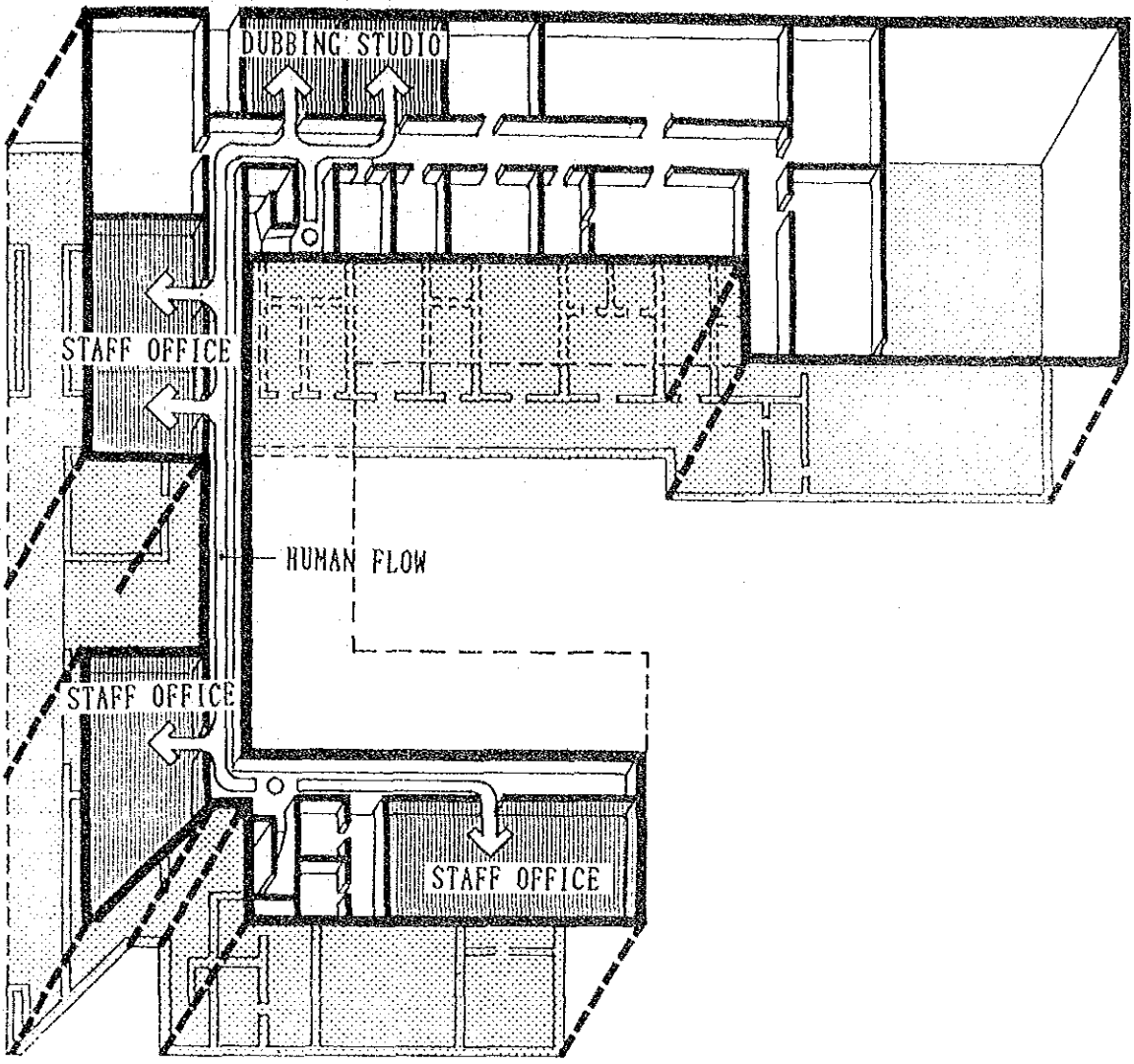


The dubbing studio is on the second floor where few visitors come.

The staff office is located far away from the rooms where broadcasting equipment is installed. It is necessary that this office has an atmosphere suitable for desk work and different from that prevalent in studios.

Thus the basic plan is characterized by 3 functional zones, smooth lines of flow and passageways facing the courtyard functioning as a street.

Fig. 16 Ground Plan-Dubbing Studio & Staff Office

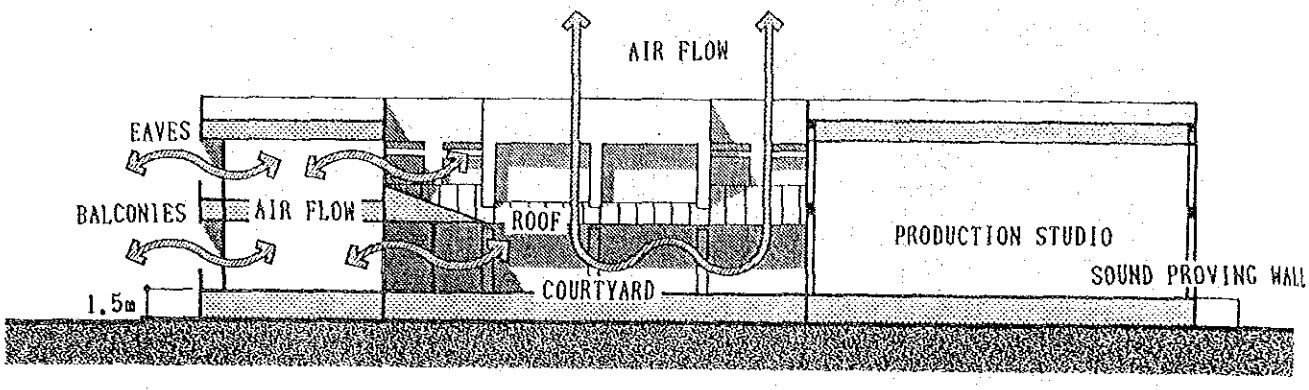


(B) Sectional Plan

Matters to be specially noted in working out the sectional plan include Bangkok's weather conditions (external conditions) and the broadcasting equipment's functional requirements (internal conditions). Of the weather conditions, floods in Bangkok and high temperature with high humidity are of utmost importance in designing the sectional plan. As a safeguard against floods and high humidity, the first floor level is elevated 1.5 m higher than the ground level. The space between the first floor and the ground can be used as space for plumbing.

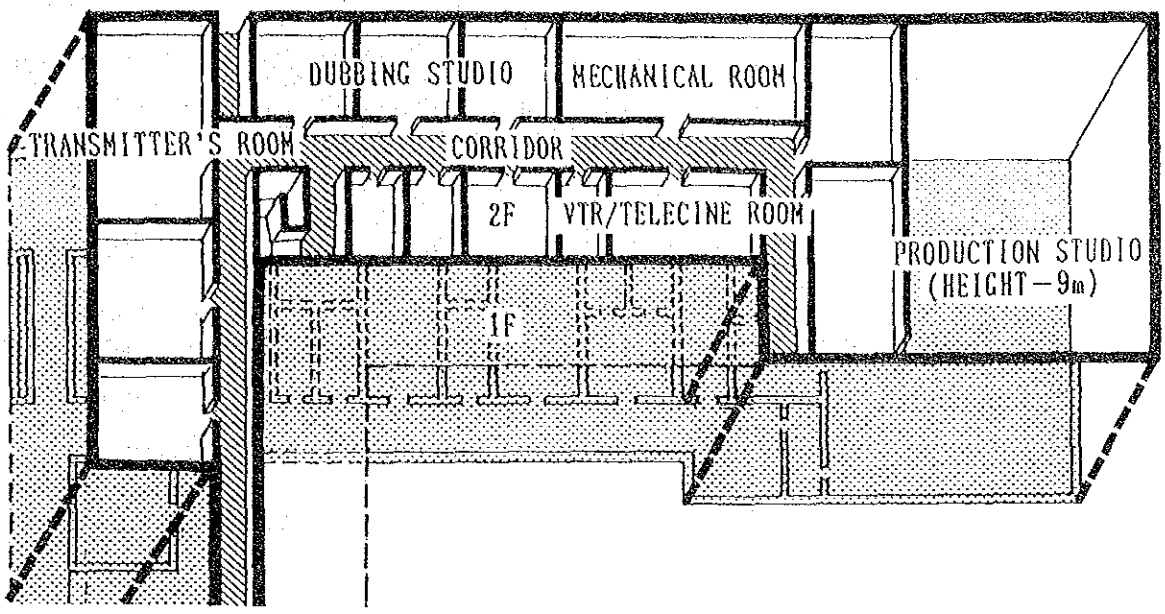
In order to cope with the climate of high temperature with high humidity, most rooms and passageways are so arranged that they may face outward for gaining maximum natural ventilation. The windows and other openings facing outward are protected from direct sunlight by eaves and balconies.

Fig. 17 Sectional Plan



The broadcasting equipment's functional requirements include the production studio's minimum ceiling height (9 m), piping/duct space in the ceiling, positional relationship between the transmitter room and the transmitting tower, sound insulation for broadcasting equipment rooms and studies, and noise control around the mechanical room. In view of these requirements, the broadcasting equipment rooms are located on the second floor where the noise level is relatively low and separated from the mechanical room with a passageway.

Fig. 18 Ground Plan-Position Relationship



(C) Structural Plan

(1) Planning Guideline

Thailand is located outside Asia's major earthquake zones and is therefore considered a country where few earthquakes occur. In 1983, however, an earthquake hit Bangkok. The epicenter of the earthquake was the suburbs of Bangkok. So it is necessary to apply an aseismatic system for the structural plan of this project. According to the "Earthquake Research Report" based on the boring test conducted on the project site and other similar reports, Bangkok's soil is characterized by a soft silt layer (about 20 M below GL), which means that land subsidence is very likely to occur in Bangkok. So it is necessary to prevent the building's uneven subsidence by keeping the balance of columns' axial force and piles' yield strength and minimize the effects of cracks in the building by disconnecting terraces and scarcements to the building with the provision of expansion joints.

(2) Structural Design

The building will employ a reinforced concrete rigid frame structure. This architectonic method of structure is common in Thailand. Lattice girders will be used for the long spans of the studios.

External force working on the building will be calculated in accordance with the Bangkok City Planning Code and stress and cross sections in accordance with the Japanese Institute of Architects's standards.

Allowable stress of materials will be determined making reference to the Thai Industrial Standards and Japanese standards and in consideration of the technical level of execution and unevenness of the quality of local materials available in Thailand.

1) Dead Load

The total dead load is the sum of the weight of structural and interior finish materials.

2) Live Load

For estimating live load for main rooms, the following figures are to be adopted.

	Floor slab(kg/m²)	Pillar/beam/foundation (kg/m²)
Studio	500	450
Rehearsal room	400	330
Transmitter room	500	450
Tape/film storage room	600	500
Stage setting room	500	450
Office/conference room	300	180

The calculation of live load for floor slabs are based on the Bangkok City Planning Code (1979) but those for column/beam/foundation are based on the provisions of the Standard Building Code of Japan.

3) Wind Load

Although the building height is about 10 m, the building is a reinforced concrete structure, which is very unlikely to be affected by wind, the value for wind pressure is negligible in calculation for structural design.

4) Resistance to Earthquake

Earthquake-resistant factors such as balanced arrangement of earthquake-proof walls will be taken into account.

(3) Structural Materials

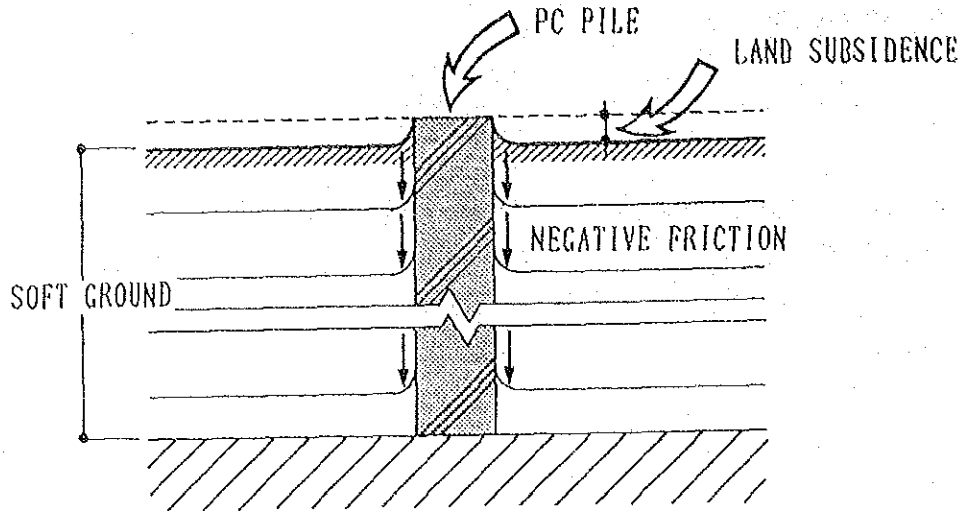
In consideration of the scale and use of the building, as well as the quality, availability and prices of materials, the following materials will be used in principle.

1) Piles

PC piles will be used in consideration of pile's yield strength and peripheral frictional resistance.

According to the boring test report, the project site's soft soil is very likely to subside. So it is necessary to examine the negative frictional resistance to confirm the safety of pile's yield strength.

Fig. 19 PC Pile-Negative Frictional Resistance



As a result of land subsidence downward frictional resistance works on the pile, thereby pile's yield strength.

2) Concrete

Standard concrete (Fc = 210 kgf/cm^2) will be used.

3) Reinforcing Bars

SD30 or SD35 will be used with the comparison of local concrete (in compliance with the Thai Industrial Standards) and Japanese (in compliance with the Japanese Industrial Standards) in terms of the quality, price, etc.

4) Structural Steel

The building will only require small-sized steel frames in the building. Their quality should be in compliance with the Thai Industrial Standards or equivalent.

(4) Structural Plan for the Transmitting Tower

In structural design in relation to the wind pressure effects on the transmitting tower, the value for wind pressure for the maximum instantaneous wind velocity 45 m/sec (at a height of 10 m) will be employed. The tower's foundation will be a reinforced concrete direct foundation. In designing the tower foundation, values for allowable ground yield strength obtained in the geological survey (see attached sheet) will be used, and the structural design will be based on the provisions of the Standard Building Code of Japan, the laws and regulations related to the Code and the Japanese Institute of Architects' structural design standards.

The steel frames for the transmitting tower will be Japanese-made ones which shall be in compliance with the Japanese Industrial Standards and the reinforcing bars for use in the foundation will be those equivalent to Japanese ones which shall be in compliance with the Japanese Industrial Standards as well.

(D) Mechanical Design

(1) Guidelines

The mechanical design should be worked out in consideration of the following.

a. To reduce the initial and running costs.
b. To reduce energy consumption.
c. To realize satisfactory durability rather than sophisticated and complicated design planning.
d. To adopt the mechanical design easy to maintain.
e. To use materials and equipment available in Thailand wherever possible.
f. To maintain artificial environmental conditions well balanced with natural conditions.

(2) Electrical Equipment

1) Power Transformer

Electricity is led into the site from the 12 KV power line of The Metropolitan Electricity of Authority (MEA). Then, voltage is dropped to 380V/220V at the power transformer room in order to supply the building.

The estimation of electricity loads based on the assumptions of the followings.

a. Lighting fixtures, receptacle outlets
b. Air conditioning, ventilating and water supply equipment
c. Studio lighting fixtures, audio equipment
d. Transmitting equipment

The noises from the luminous intensity control will be eliminated with the luminous intensity control transformer.

2) Main Electric Power Distribution

The main electric power will be 3-phase 3-line 380V for main equipment and 3-phase 4-line 380V/220V for lighting fixtures and receptacle outlets. The wiring will generally adopt metal tube wiring method, and only for high tension lines the cable wiring will be employed. Main electric wires will be protected from overload and short circuit with a circuit breaker.

3) Lighting Fixtures and Receptacle Outlets

Light sources will be fluorescent lamps in principle. Lighting fixtues should be so arranged that generate no uneven lighting or glare. As many switches as possible should be installed so that they may contribute to energy conservation and economical operation. Streetlamps will be installed on the walkways for security purposes. These streetlamps will be automatically turned on and off.

The average luminous intensity of the main lighting fixtures is as shown below.

* Office, conference room	300 lx
Monitor	
* Control room and others	300 lx
* Passageways and hall	100 lx

Receptacle outlets will be installed on the walls of rooms, passageways, hall, etc.

4) Telephone Equipment

A telephone wire will be led in to the MDF board within the building by the Telephone Organization of Thailand (TOT). A switchboard will be equipped in the building. The switchboard will be equipped with a direct current power generator so that it may work even at the time of power failure.

5) Public Address System

Paging and BGM broadcasting will be done with a public address system.

6) Automatic Fire Alarm Equipment

This equipment will automatically detect a fire at its initial stage and at the same time give the alarm and indicate the location where the fire occurred. Smoke detectors will be installed at emergency exits of passageways and staircases, and a thermal detector on the ceiling of each room.

A display device on which where the fire has originated is shown will be installed in the office.

7) Other

Since the lightning rod installed on top of the transmitting tower will cover the station building, no additional lightning protection equipment will be installed on top of the building.

(3) Air Conditioning and Ventilating Equipment

1) Air Conditioning Equipment

An air conditioning system to be installed in the station building must be one which costs reasonably in terms of both installation and operation, is durable and easy to maintain, and is energy saving. In consideration of easiness of maintenance at the time of breakdown, separate air-cooled, package-type air conditioners (cooling only), not a centralized air conditioning system, will be employed.

The air conditioning units will be installed at:

a. Production studio, transformer and dimmer room, subcontrol room.
b. News studio, control room

c. Dubbing studio

d. Master control room, VTR equipment room, telecine room, tape storage room.

e. Transmitter's room

g. Other broadcasting-related rooms, engineering department's rooms

h. Office rooms

Steps to cope with the noises and vibrations from the air conditioning equipment should be taken on the basis of the following conditions.

Outdoor conditions	Temperature:	35°C,	Humidity:	75%
Indoor conditions	Temperature:	27°C,	Humidity:	55%
	Noise NC 25 (studio)			

2) Ventilating Equipment

Class 1 Ventilating Method (forced ventilation by machine) will be employed for the machine and electricity rooms and Class 3 Ventilating Method (forced exhausting by machine) will be employed for the toilets, kitchenette and locker room. Natural ventilation system will be employed in other facilities.

(4) Water Supply and Sanitary Equipment

1) Water Supply Equipment

Water led in the site through the feeder from the water main of the Metropolitan Water Works Authority (MWWA) will be put into the cistern and then pumped up to the elevated water tank.

The cistern's capacity is based on the daily water consumption of 154 persons x 110 liters (per capita). Since many staffers will work in three shifts, the total daily water consumption will be about two-third of the above.

2) Sewerage Equipment

Sewerage generated in the building will be divided into human waste and waste water. Human waste will be treated in septic tanks and then discharged together with waste water.

The septic tank is made of FRP and equipped the aeration treatment system.

3) Sanitary Equipment

Stools, urinals, washbowls, cocks, etc., will be installed in each lavatory and kitchenette. Two types of stools -- Western type and Thai type -- will be available.

4) Hot Water Supply Equipment

Hot water will be supplied from an electric water heater (20L) installed at the kitchenette.

5) Fire Extinguishing Equipment

Indoor fire extinguishers will be installed in many places in the building. They will be instrumental in extinguishing a fire at its initial state.

(E) Building Materials Plan

Thai-made building materials will be used in principle. However, fittings and those building materials which are essential to smooth functioning of major equipment but not available in Thailand will be Japanese-made ones.

Type of work	Material or equipment	Thai-made	Japanese-made	Remark(s)
Concrete	Portland cement	○		
	Coarse sand	○		
	Fine sand	○		
	Gravel	○		
	Rubble	○		
Reinforcing bar	Deformed bar		○	Thai-made reinforcing bars are of high quality and can be used for the project, but Japanese-made ones are favorable in terms of costs (including transporting cost)
Steel frame	Small-sized steel frame (angle, channel)	○		
	Large-sized steel frame		○	Only structural materials with long span for use in the transmitting tower and the station building should be Japanese-made ones which are in compliance with JIS. All the others should be Thai-made ones which are in compliance with TIS.
	Steel plate		○	
	Bolt		○	
Brick and block	Brick	○		
	Conrete Block	○		
Water-proofing	Asphalt		○	Thai-made asphalt deteriorates in less than 10 years.
	Calking agent		○	There are no Thai-made calking agents available. U.S.-made and Japanese-made calking agents are widely used.
	Polyethylene sheet	○		
	Mortar	○		

Type of work	Material or equipment	Thai-made	Japanese-made	Remark(s)
Tile	(floor) Semiporcelain tile		○	Foreign-made semiporcelain tiles are widely used.
	Mosaic tile		○	Same as above
	Terazzo block	○		
	(wall) Semi-porcelain tile		○	Same as above
Lumber	Teak	○		
	Lauan	○		
Roof	Corrugated slate	○		
	Galvanized iron plate		○	Thai-made galvanized iron plates deteriorate quickly.
Metal	Checker plate	○		
	Grating		○	Thai-made gratings are low in reliability in terms of resistance to load.
	Stainless steel pipe		○	No stainless steel pipe is manufactured in Thailand.
Plaster work	Mortar	○		
	Plaster	○		
	Corner bead		○	Japanese-made corner beads are favorable in terms of quality and cost.
	Casing bead		○	Same as above
Wooden furniture	Sliding doors	○		
	Hinged doors	○		
	Door frame	○		
	Window frame	○		
Aluminum furniture	Sliding windows		○	It is very difficult to procure Thai-made airtight and water-tight aluminum furniture. It must be specially made to order, and is therefore very expensive.
	Sliding doors		○	
	Hinged doors		○	
	Curtain wall		○	

Type of work	Material or equipment	Thai-made	Japanese-made	Remark(s)
Steel furniture	Studio's doors		○	They must be highly sound insulated.
	Stage setting production room's doors		○	They must be large-sized and of highest sophistication.
Finish hardware	Hinge		○	U.S.-made finish hardware is widely used in public buildings and facilities similar to those to be constructed in this project. It is very difficult to procure Thai-made finish hardware.
	Pivot hinge		○	
	Door check		○	
	Doorstop		○	
	Cylinder lock		○	
Glass	Transparent polished glass	○		
	Rolled plate glass	○		
Painting	Oil paint	○		
	Emulsion-based paint	○		
	Vinyl chloride-based paint	○		
	Clear lacquer	○		
	Acryl-based paint	○		
Interior finish work	Vinyl foor tile	○		
	Long vinyl chloride sheet		○	The sheet is for use in the studios and is therefore required to be highly durable. Thus Japanese-made sheets should be used for this purpose.

Type of work	Material or equipment	Thai-made	Japanese-made	Remark(s)
	Plywood	○		
	Punched plywood	○		
	Plaster board	○		
	Asbestos cement board	○		
	Rock wood sound absorbing board		○	Japanese-made rock wood sound-absorbing boards should be used because high sound-absorbing capability is required of this type of board.
	Sink		○	If ready-made sinks are to be used, Japanese-made ones are favorable in terms of cost and quality.

(2) Grading

Grading will be done on the basis of the above-mentioned design guidelines and taking the following into account.

Points to be specially noted (a,b,c)

a. Building materials and broadcasting equipment which can be repaired or replaced in Thailand should be used wherever possible.

b. Building materials of high quality should be used so that they may facilitate maintenance of broadcasting equipment.

c. Grades of materials and equipment should be equivalent to those of materials and equipment used in the existing public facilities and similar facilities in Thailand.

In grading the building, building equipment and broadcasting equipment it is necessary to have a clear grasp of the current state of the building industry in Thailand. It is essential to do grading in keeping with the current state of the broadcasting industry in Thailand, in other words, putting oneself in the prospective station staffers' place.

Accordingly, the structural design, the construction method and the exterior/interior finish method should be as shown below. The broadcasting equipment should be procured in Japan inview of the contents of programs to be broadcast. However, equipment of highest grade should be avoided. Equipment which is standard and easy to operate should be chosen.

Structural design and construction methods

Item	Structural design or Construction method	Point(s) to be specially noted
Main structure	Reinforced concrete, rigid frame structure	a, c
Foundation	Thai-made P.C. piles (30 m)	c
External walls	Reinforced concrete	a, c
Internal partitions	Reinforced concrete blocks (thickness: 150 mm)	a, c
Floor slab	Reinforced concrete, monobloc structure	a, c

Exterior/interior finish

Item	Construction method	Point(s) to be specially noted
Exterior walls	Mortar undercoating, resin spraying Exposed concrete finish (partial) Tracery block (partial)	a, c a, c a, c
Exterior flooring	Terrazzo tile PC concrete slab	a, c a, c
External door/ window	Aluminum-framed window Steel door	b b
Coping window frame	PC concrete	a, c
Interior flooring	Vinyl floor tile Long vinyl chloride sheet Terrazzo tile terrazzo finishing	a, c b a, c a, c
Interior walls	Mortar undercoating, emulsion paint coating Wooden punching board undercoating, cloth coating	a, c a, c
Ceiling	Plaster board Asbestos cement board Rock wood sound-absorbing board	a, c a, c b
Interior fittings	Steel door Wooden door	b a, c

4-3-4 Broadcasting Equipment Plan

The policy of basic design for the project is to design the broadcasting equipment so as to display their functions most effectively and construct most economically.

Composition List of Main Equipment

a) Transmission System

Equipment	Q'ty (set)	Remark
20kw VHF transmitting equipment	1	
20kw transmitter	2	Is: Stand by
Cooling blower	2	Is: Stand by
CIN diplexer	2	Is: Stand by
Harmonic filter	2	Is: Stand by
Program input and monitoring equipment	1	
Video distribution amplifier	2	
Automatic peak controller	2	
Visual demodulator	1	
Aural demodulator	1	
Video monitor	1	
Audio monitor	1	
Indoor coaxial equipment	1	
Coaxial feeder	1	
Coaxial changeover switch	1	
Test load	1	

Main feeder	1	
Coaxial feeder	1	
Dehydrator	1	
Transmitting antenna	1	8 stacks,
Dipole antenna panel	26	3 faces,
Branch box	1	2 stacks,
Branch feeder	1	1 face
Self-supporting tower (h: 180 m)	1	

b) Program transmission link

Micro wave equipment	1	
Micro wave transmitter	1	
Micro wave receiver	1	
Parabolic antenna	2	Transmitter (Tx)-1 Receiver (Rx)-1
Wave guide	2	Tx-1, Rx-1
Wave guide	2	Tx-1, Rx-1
Dehydrator	2	Tx-1, Rx-1

c) Program production and playback equipment

News studio (50 m²)	1
Color camera	2
Camera head	2
Control unit	2
Zoom lens	2
Tripod dolly	2
Telop Equipment	1

Charactor generator	1	
Video control equipment	1	
Control desk	1	
Production switcher	1	
Soft chromakey device	1	
Special effect device	1	
Video distribution amplifier	1	
Microphone	1	
Audio control equipment	1	
Control desk	1	
Control amplifier	1	
Audio tape recorder reproducer	2	
Audio cassette recorder	1	
Audio disc player	1	
Monitor equipment	1	
Wave form monitor	1	
Vector scope	1	
Video monitor	1	
Audio monitor	1	
Lighting equipment	1	
Suspension device	1	
Dimmer device	1	
Lighting device	1	
Color filter	1	
Master control room		
Sync signal generator	1	Hot-stand by system
Sync signal generator	2	
Sync signal switcher	1	
Sync signal distributor	1	
Program control switcher	1	
Signal switcher	1	
Video control amplifier	1	
Video distributor	1	

Audio limiting amplifier	1
Audio distributor	1
Video distribution amplifier	1
Audio peak controller	1
Audio distribution amp.	1
Monitor equipment	1
Wave form monitor	1
Vector scope	1
Video monitor	1
Audio monitor	1
Clock system	1
Room to room intercom	1
Recording-playback equipment	
Recording-playback VTR	
1 inch format-C VTR	3
3/4 inch Umatic VTR	4
Telecine chain	1
16 mm film projector	2
35 mm slide projector	1
Optical multiplexer	1
Vidicon camera	1
Input-output switcher	1
Monitor equipment	1
Waveform monitor	1
Vector scope	1
Video monitor	1
Audio monitor	1
.VTR editing equipment	1
3/4 inch Umatic playback VTR	2
3/4 inch Umatic recording VTR	2
VTR editor	2
Time code generator	2

Video monitor	2
Audio monitor	2
.Dubbing studio (25 m²)	1
Microphones	1
Audio control equipment	1
Control desk	1
Control amplifier	1
Audio tape recorder	2
3/4 inch Umatic playback VTR	1
PAL system	1
NTSC system	1
3/4 inch Umatic recording VTR	1
PAL system	1
Television standard converter	1
Monitor equipment	1
Waveform monitor	1
Vector scope	1
Audio monitor	1
.Production studio (300 m²)	1
Color camera	3
Camera head	3
Control unit	3
Zoom lens	3
Pedestal dolly	3
Telop Equipment	1
Character generator	1
Video control equipment	1
Control desk	1
Production switcher	1
Chromakey device	1
Special effect device	1

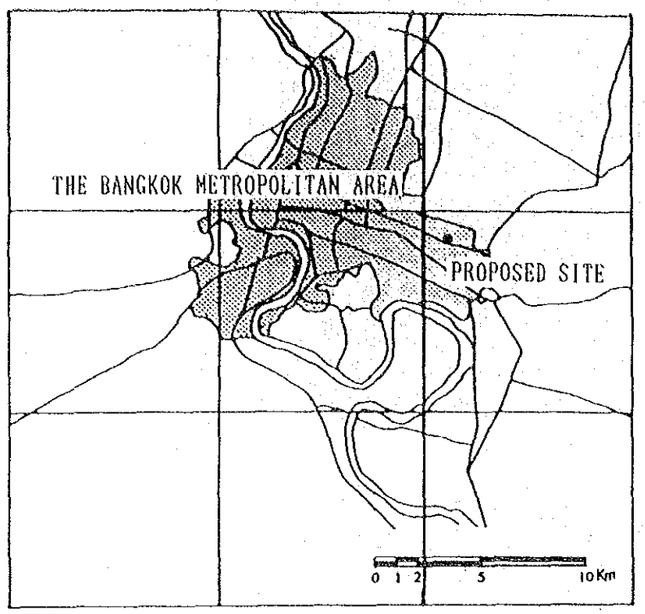
Video distribution amplifier	1
Microphones	1
Audio control equipment	1
Control desk	1
Control amplifier	1
Audio tape recorder reproducer	2
Audio cassette tape recorder	1
Audio disc player	1
Monitor equipment	1
Waveform monitor	1
Vector scope	1
Video monitor	1
Audio monitor	1
Lighting equipment	1
Suspension device	1
Dimmer unit	1
Operation desk	1
Dimmer device	1
Lighting device	1
Spot light	1
Flood light	1
Cyclorama light	1
Follow spot light	1
Effect spot light	1
Color filter	1
.OB van	1
Color camera	2
Camera head	2
Control unit	2
Zoom lens	2
Tripod dolly	2

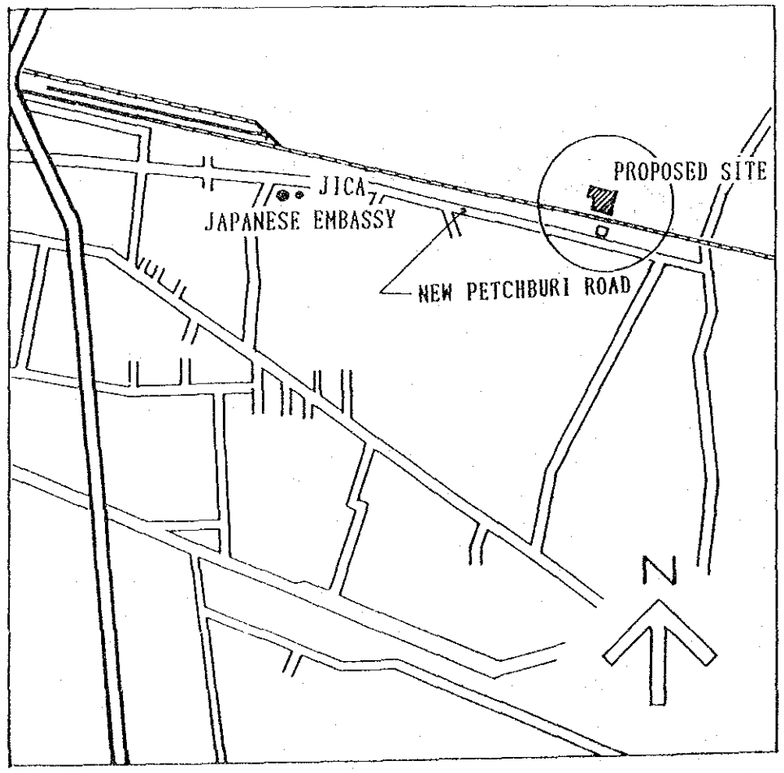
Video control equipment	1
Control desk	1
Video switcher	1
Video amplifier	1
Special effect	1
Microphones	1
Audio control equipment	1
Control desk	1
Control amplifier	1
Audio tape recorder reproducer	1
Audio cassette recorder	1
Sync signal generator	1
Sync generator	2
Sync switcher	1
Sync distributor	1
Monitor equipment	1
Waveform monitor	1
Vector scope	1
Video monitor	1
Audio monitor	1
FPU (Field Pickup)	1
Microwave link	1
Parabolic antenna	2
Wireless intercom	1
VHF device	1
VHF antenna	2
Engine generator	1
Engine generator	1
Power distributor	1
Vehicle	1

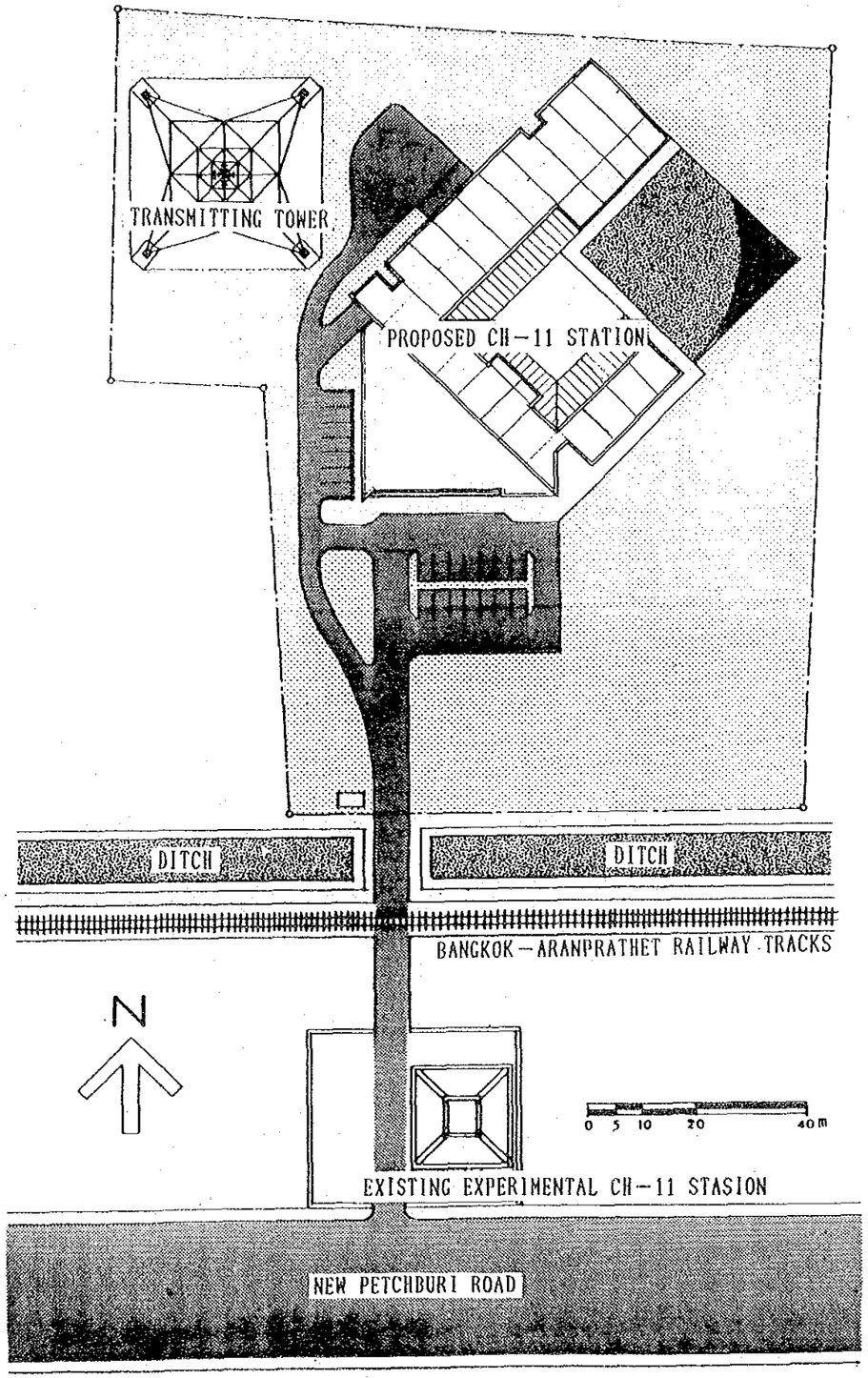
Measuring equipment	
Transmission	
Spectrum analyzer	1
AM side band analyzer	1
TV test signal generator	1
Audio distortion meter	1
Oscilloscope	1
RF attenuator	1
Frequency counter	1
Coaxial power meter	1
Megohm meter	1
Voltmeter	1
Circuit tester	4
Video signal	1
Oscilloscope	1
TV test signal generator	1
Video attenuator	1
Wave form monitor	1
Vector scope	1
Circuit tester	3
Audio signal	1
Audio distortion meter	1
Audio attenuator	1
Lighting	1
Illumination meter	1
Color meter	1

4-3-5 Basic Design Drawings

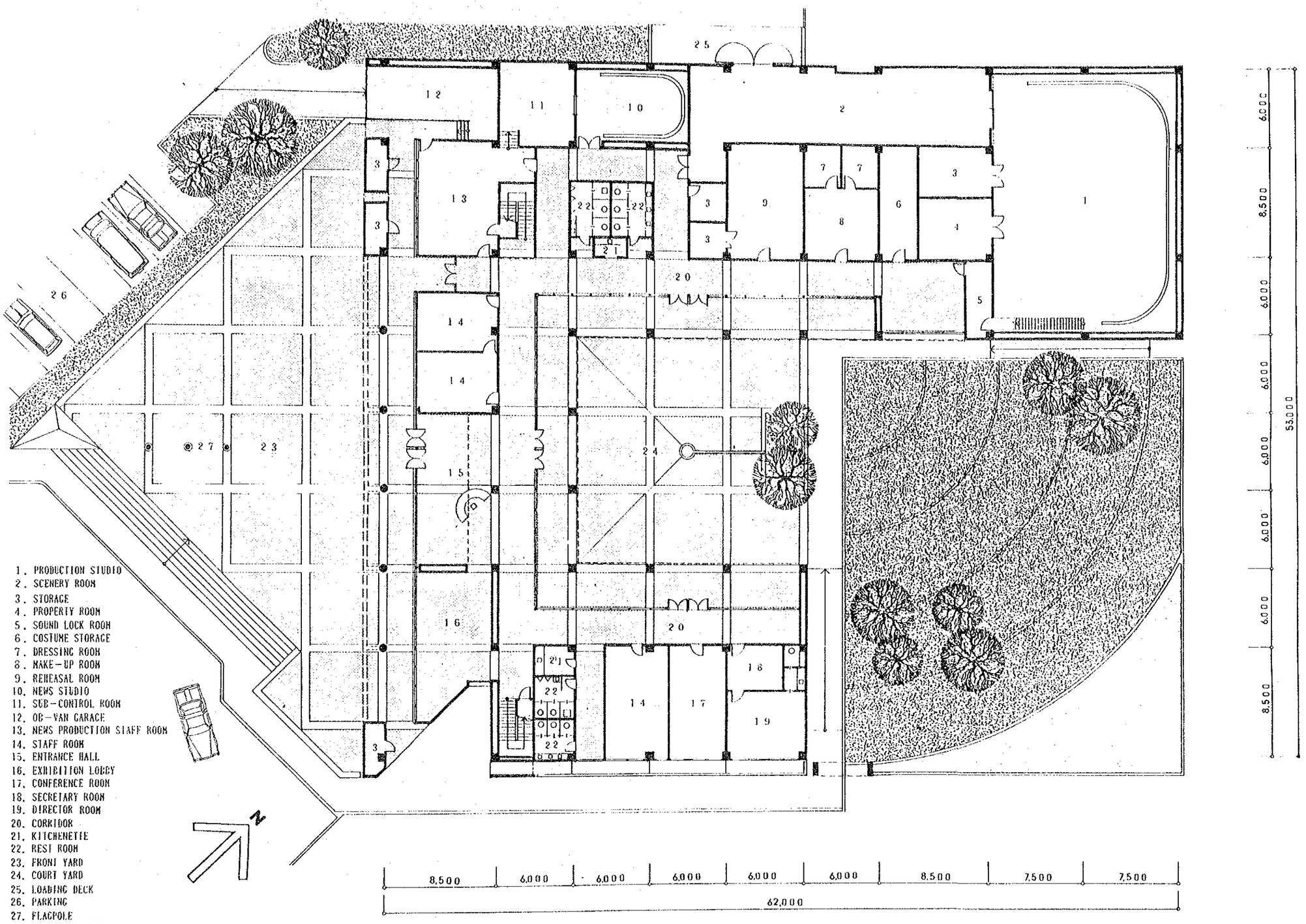
(1) Site Plan
(2) Ground Floor Plan
(3) 2nd Floor Plan
(4) Elevation-I
(5) Elevation-II
(6) Section Plan
(7) System Diagram of TV Broadcasting Station
(8) Block Diagram of Transmitting Facilities
(9) Layout of Equipment in Transmitter Room
(10) External Appearance of Transmitting Tower
(11) Block Diagram of Subcontrol Equipment for News Studio
(12) Block Diagram of TV Lighting System for News Studio
(13) Layout of Equipment in Subcontrol Room for News Studio
(14) Block Diagram of Master Switcher
(15) Layout of Equipment in Master Control Room
(16) Block Diagram of Telecine/VTR Facilities
(17) Layout of Equipment in Telecine/VTR Room
(18) Block Diagram of Editing Equipment
(19) Layout of Equipment in Editing Room
(20) Block Diagram of Dubbing Studio
(21) Layout of Equipment in Subcontrol Room for Dubbing Studio
(22) Block Diagram of Subcontrol Room for Production Studio
(23) Block Diagram of TV Lighting System for Production Studio
(24) Layout of Equipment in Subcontrol Room for Production Studio
(25) Block Diagram of OB Van
(26) Layout of Equipment in OB Van







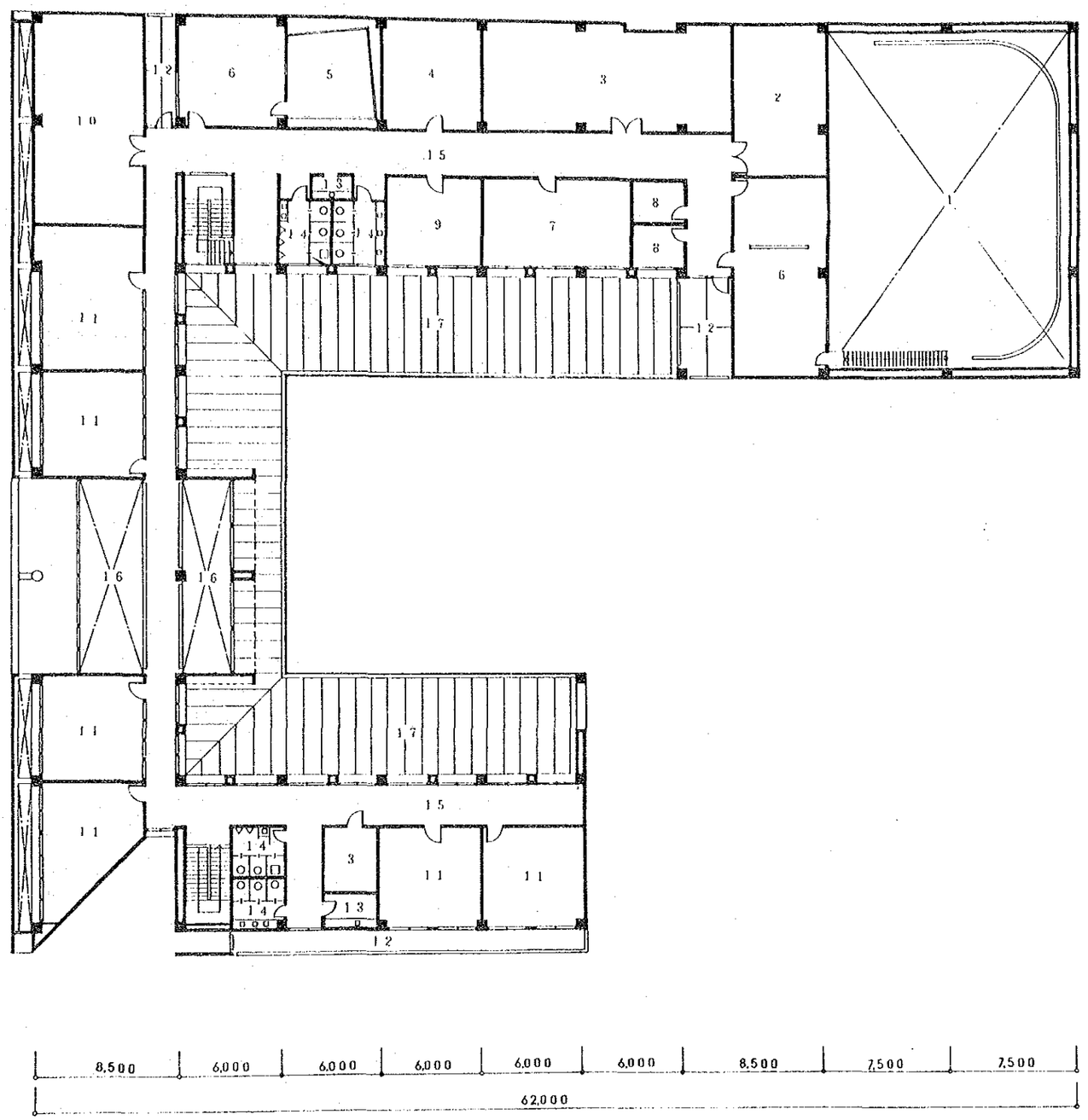
LOCATION & SITE PLAN 1



1st FLOOR PLAN

0 1 5 10 20m

2

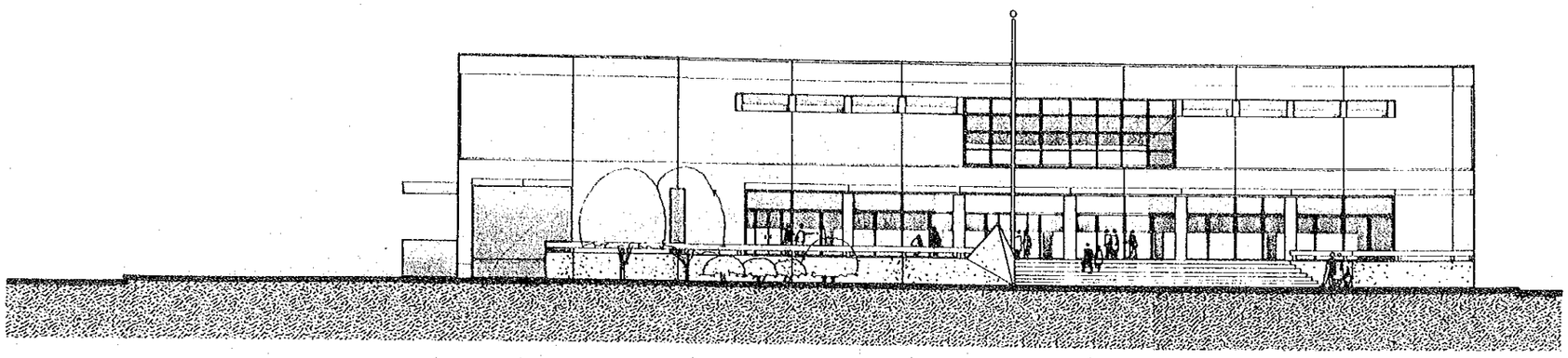


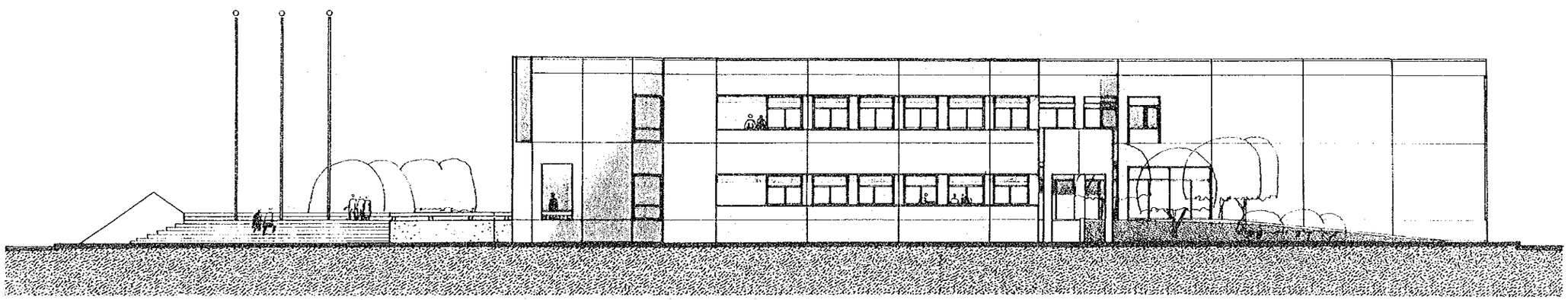
1. VOID (PRODUCTION STUDIO)
2. TRANSFORMER AND DINNER ROOM
3. MECHANICAL ROOM (AIR CONDITIONING)
4. TAPE AND FILM STORAGE
5. DUBBING STUDIO
6. SUB-CONTROL ROOM
7. VTR/TELECINE ROOM
8. VTR EDITING ROOM
9. MASTER CONTROL ROOM
10. TRANSMITTER ROOM
11. STAFF ROOM
12. BALCONY
13. KITCHENETTE
14. REST ROOM
15. CORRIDOR
16. VOID (ENTRANCE HALL)
17. ROOF

2nd FLOOR PLAN

0 1 5 10 20m

3

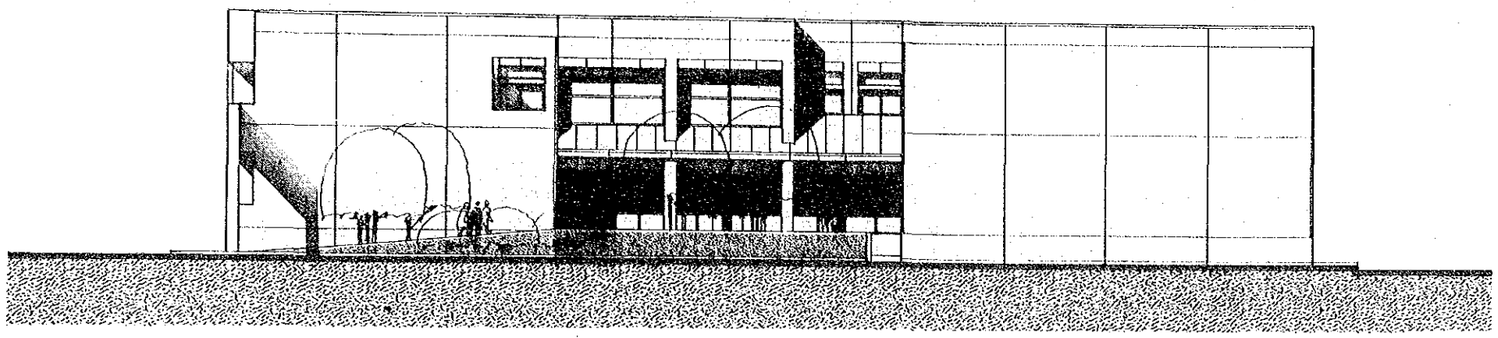


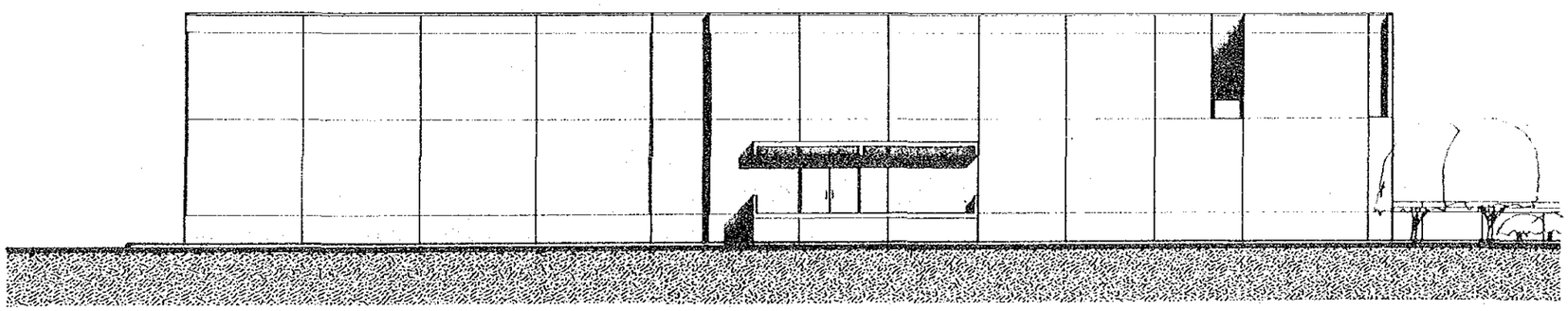


ELEVATION I

0 1 5 10 20m

4

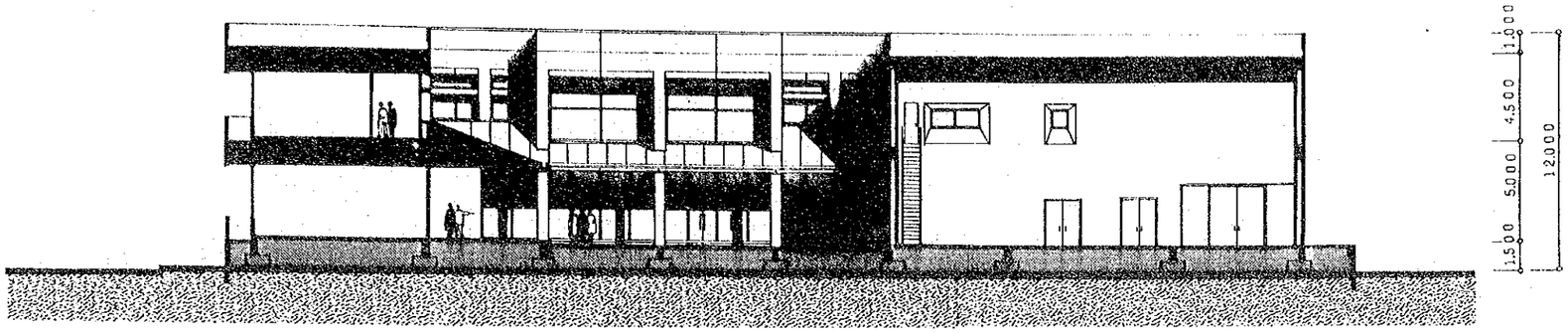


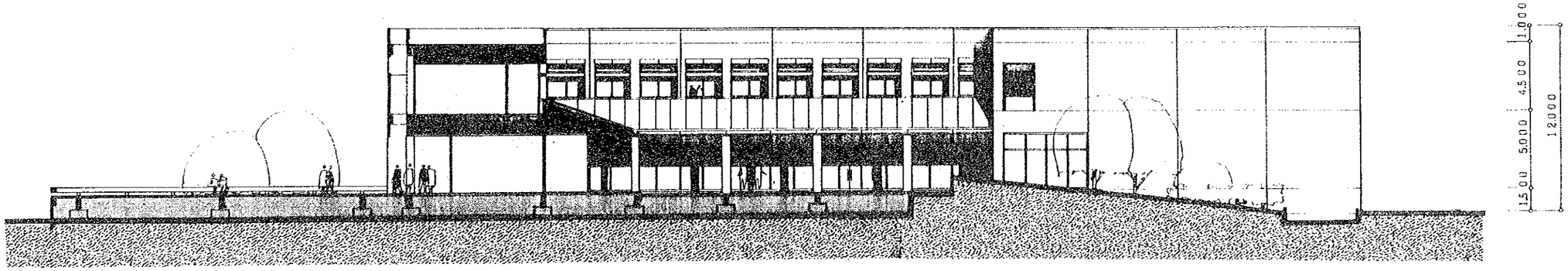


ELEVATION II

0 1 5 10 20m

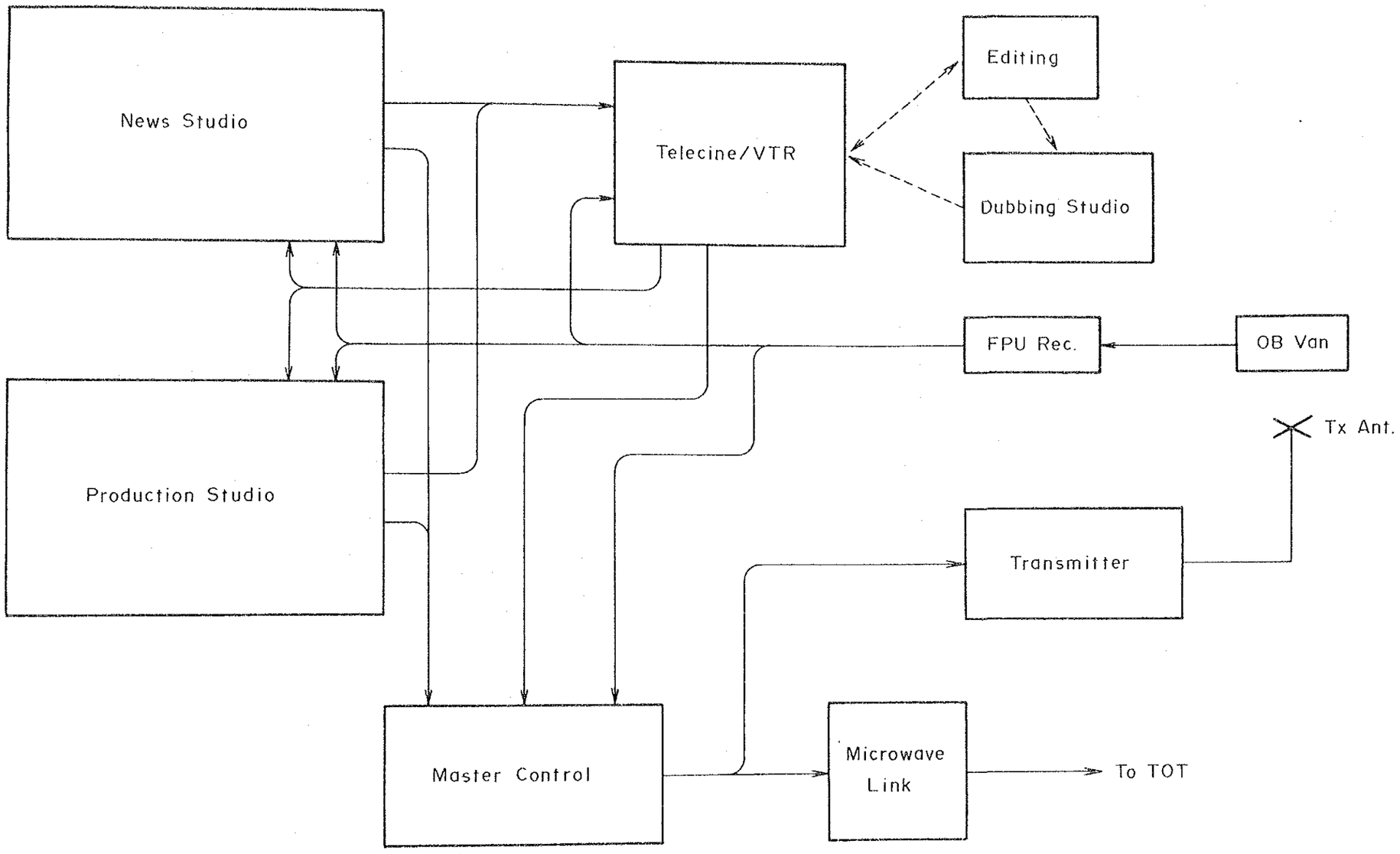
5



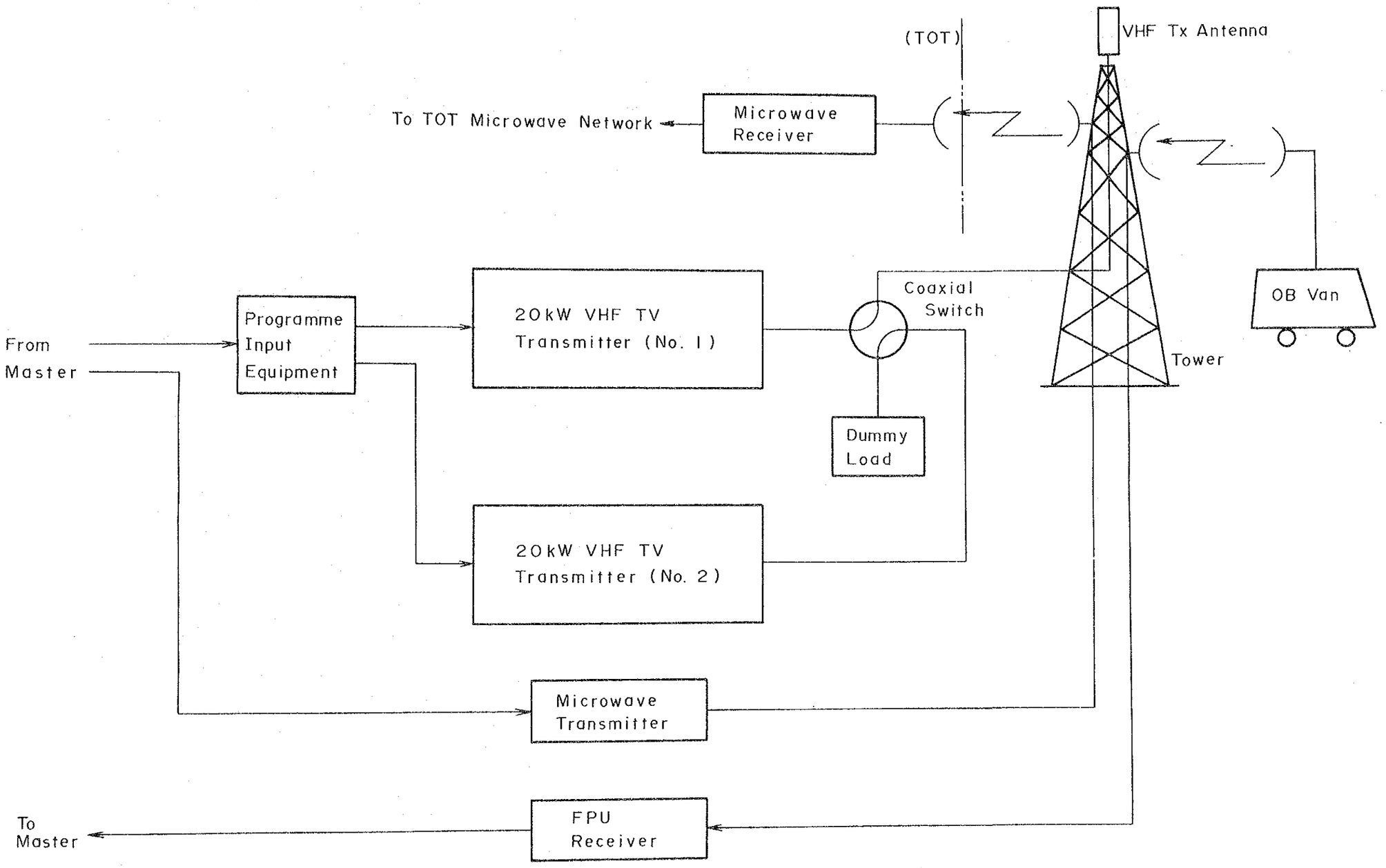


SECTION 6

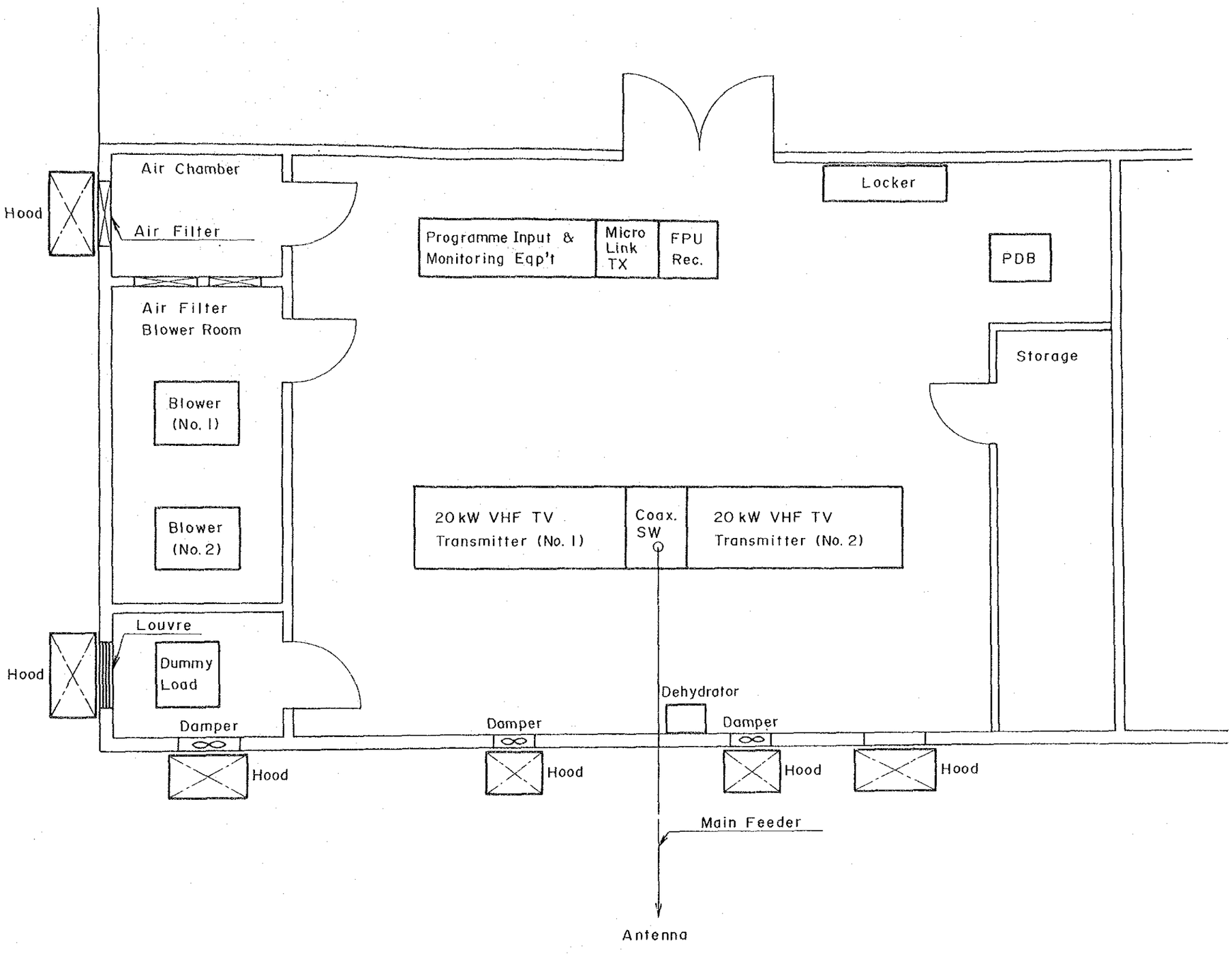
0 1 5 10 20m



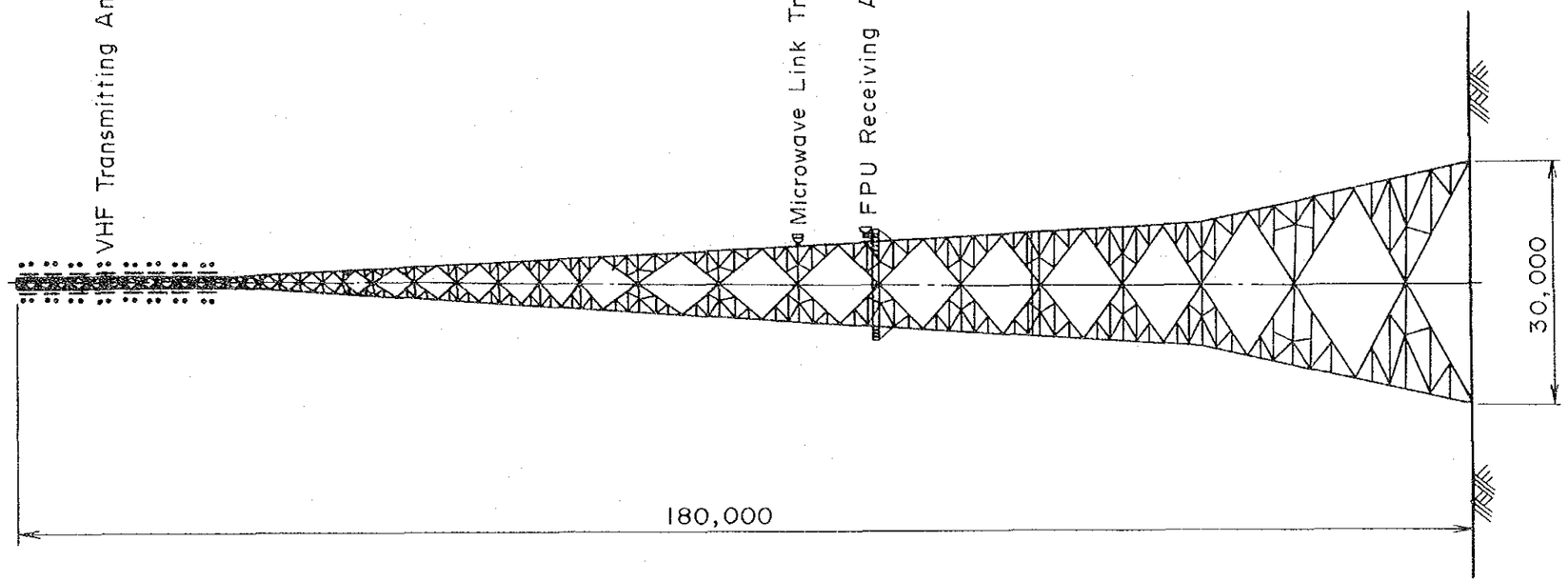
System Diagram of TV Broadcasting Station 7



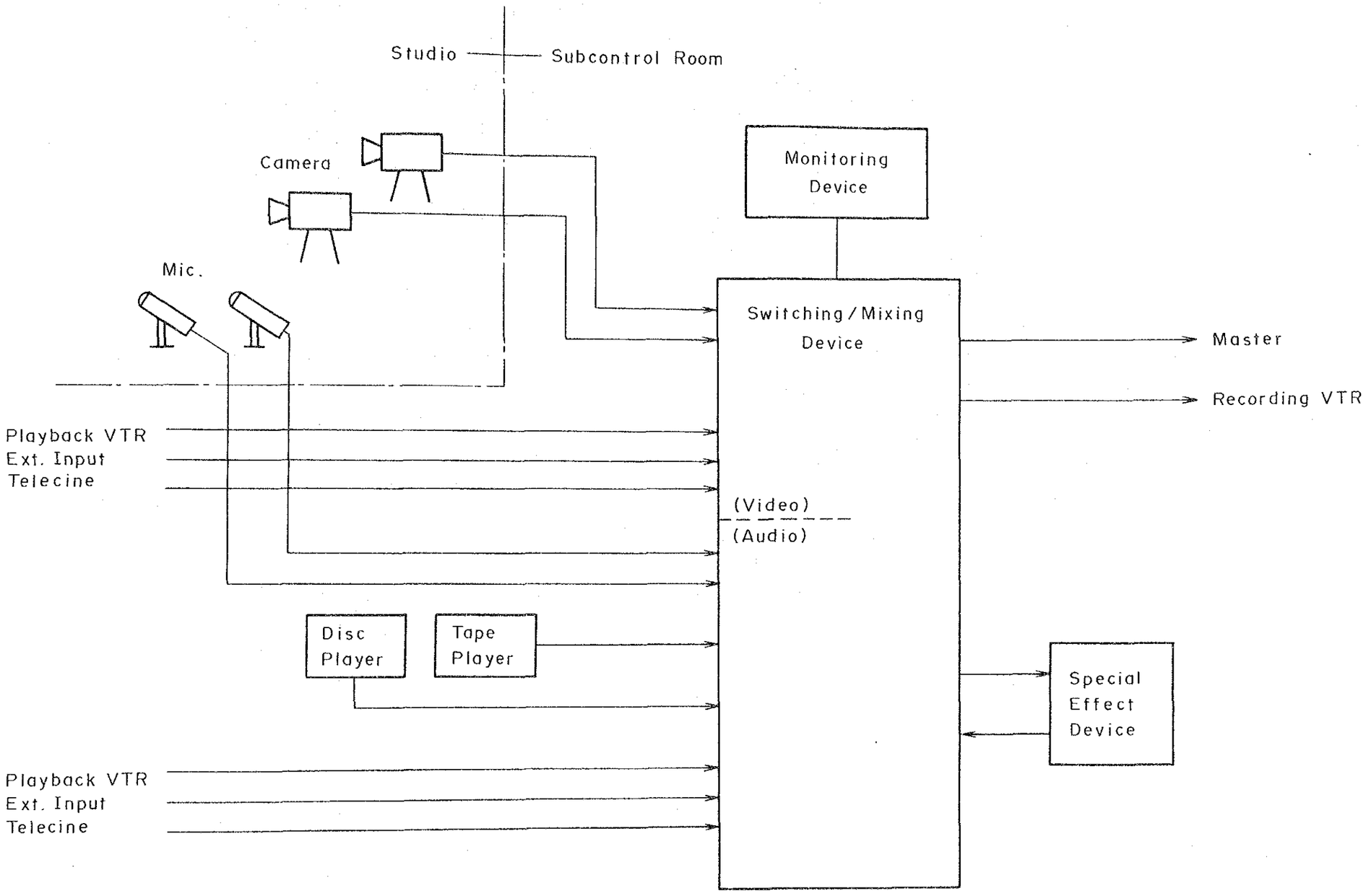
Block Diagram of Transmitting Facilities 8



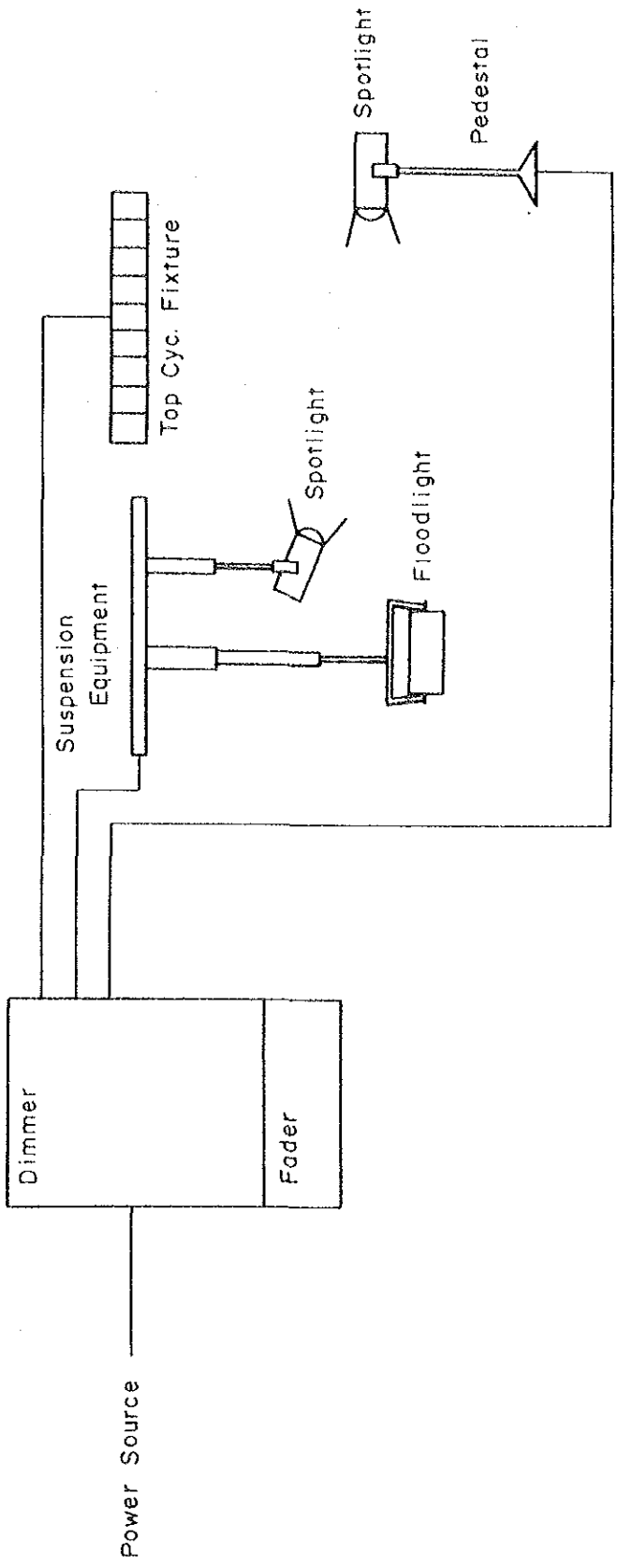
Layout of Equipment in Transmitter Room 9



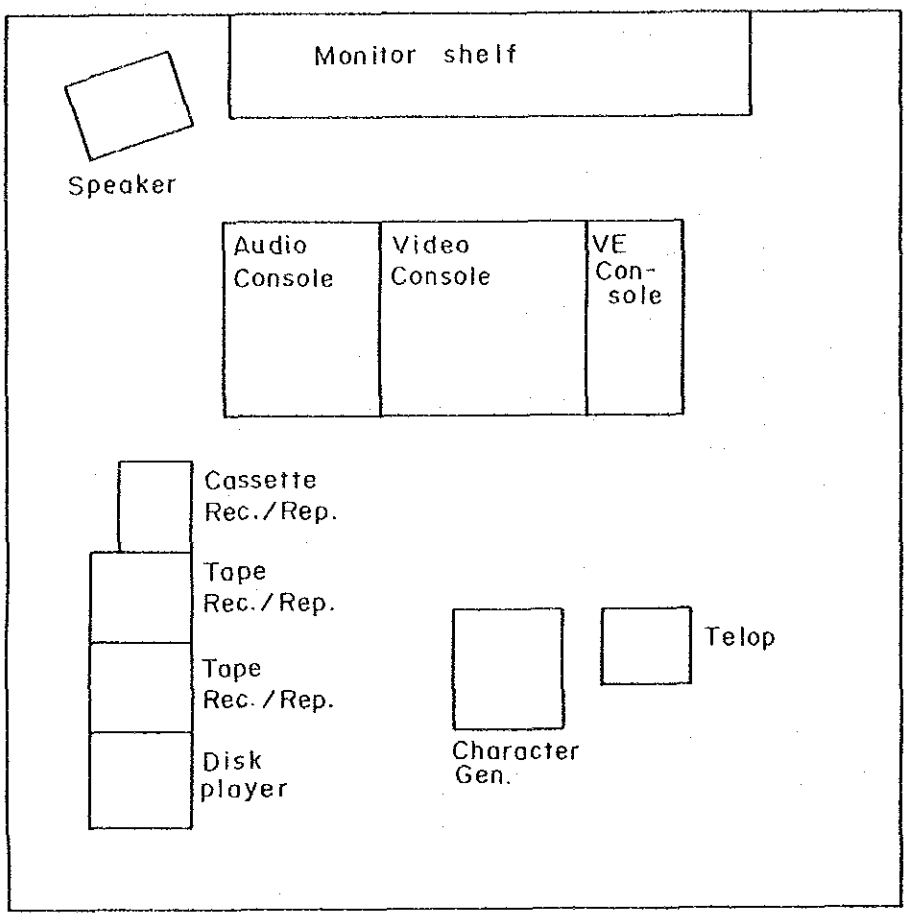
External Appearance of Transmitting Tower **10**



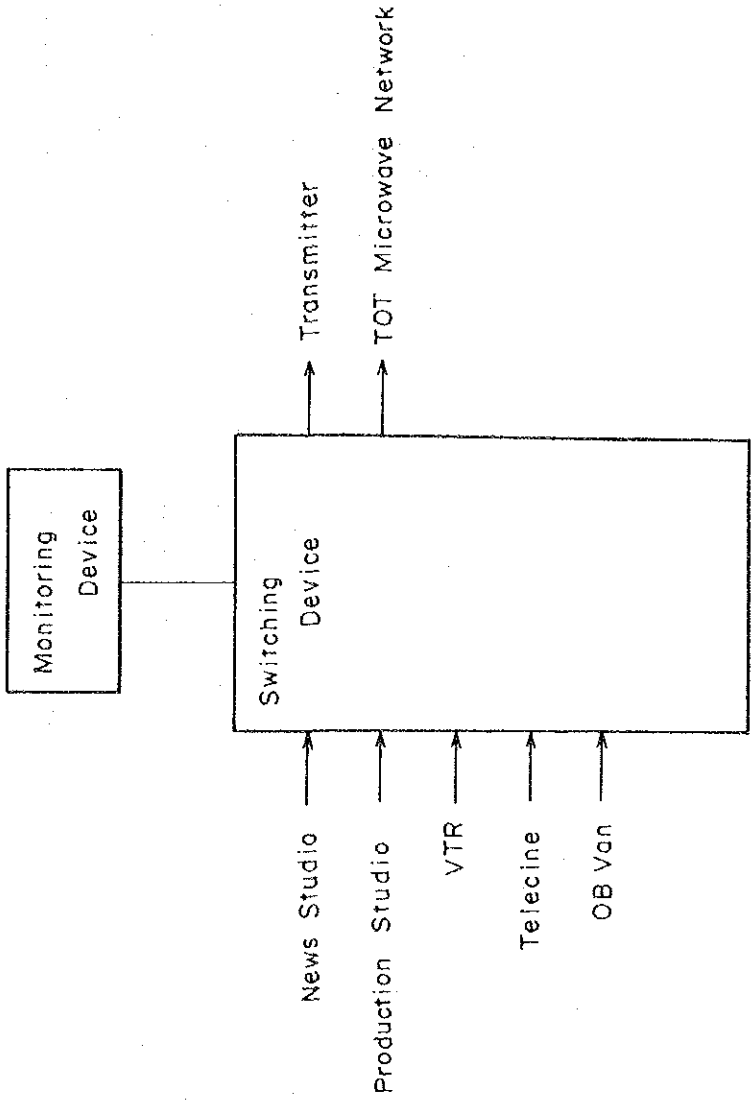
Block Diagram of
Subcontrol Equipment for News Studio 11



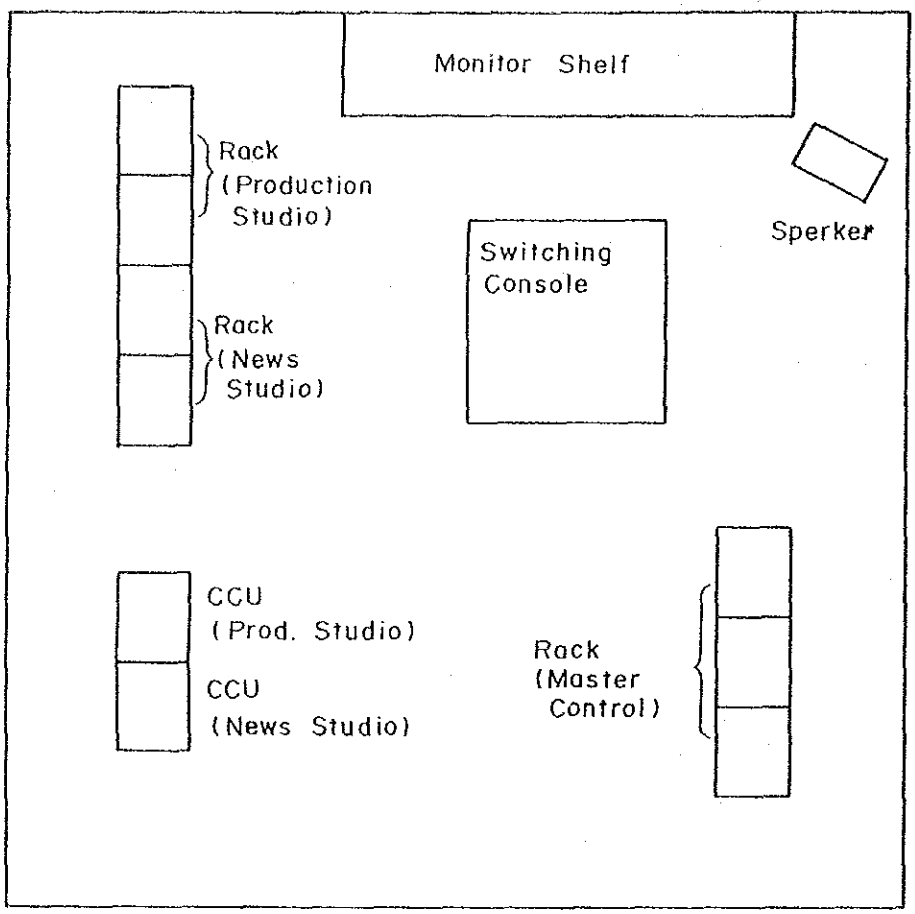
Block Diagram of
TV Lighting System for News Studio 12



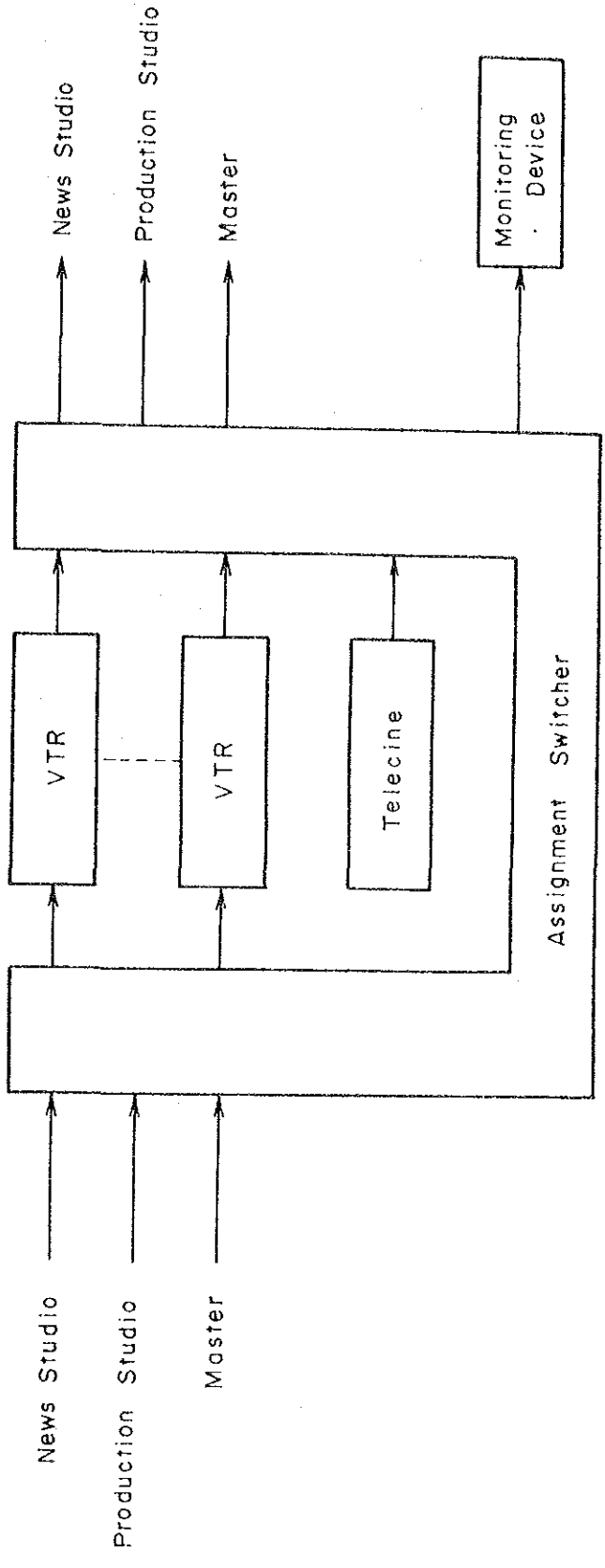
Layout of Equipment in Subcontrol for News Studio 13



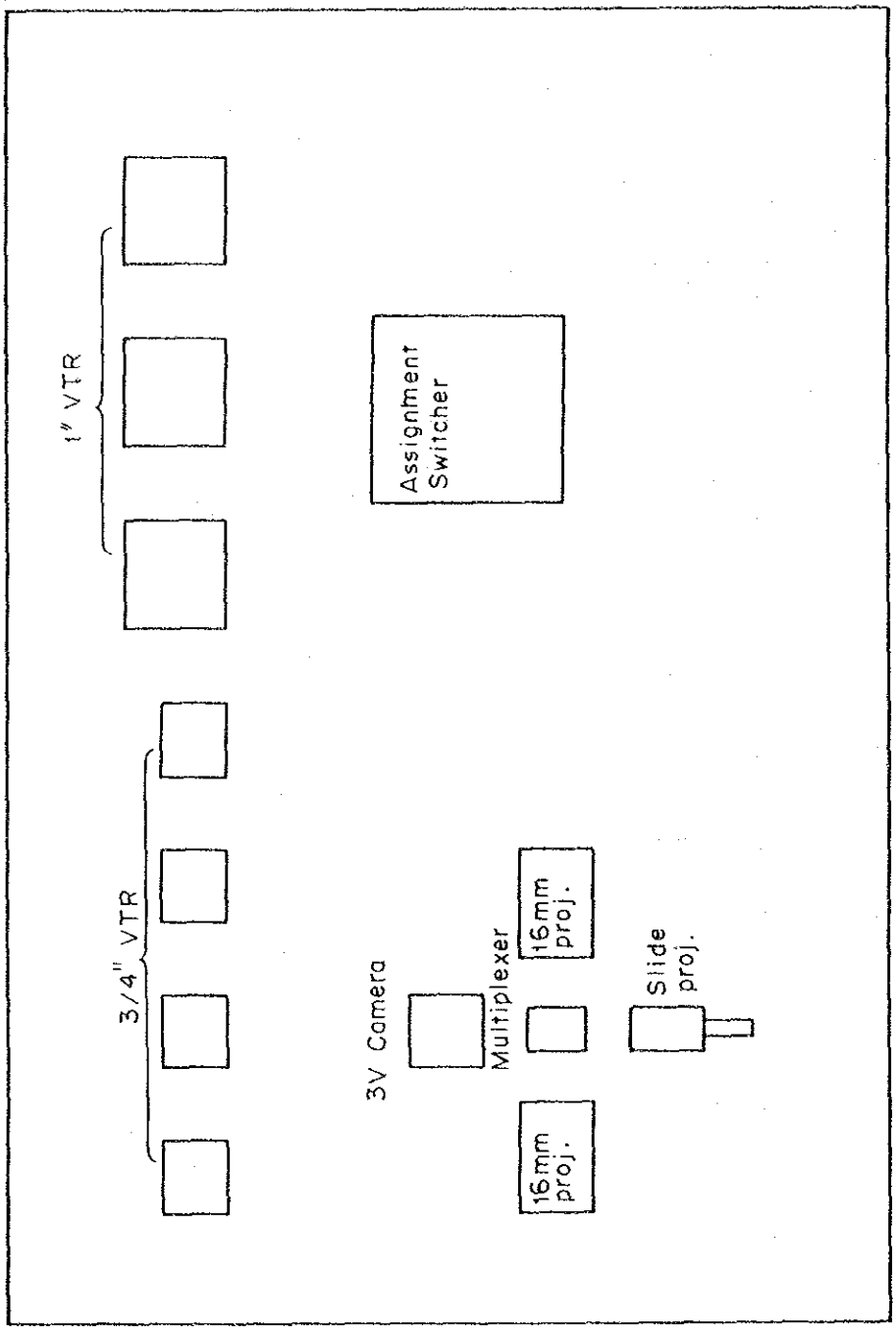
Block Diagram of Master Switcher 14



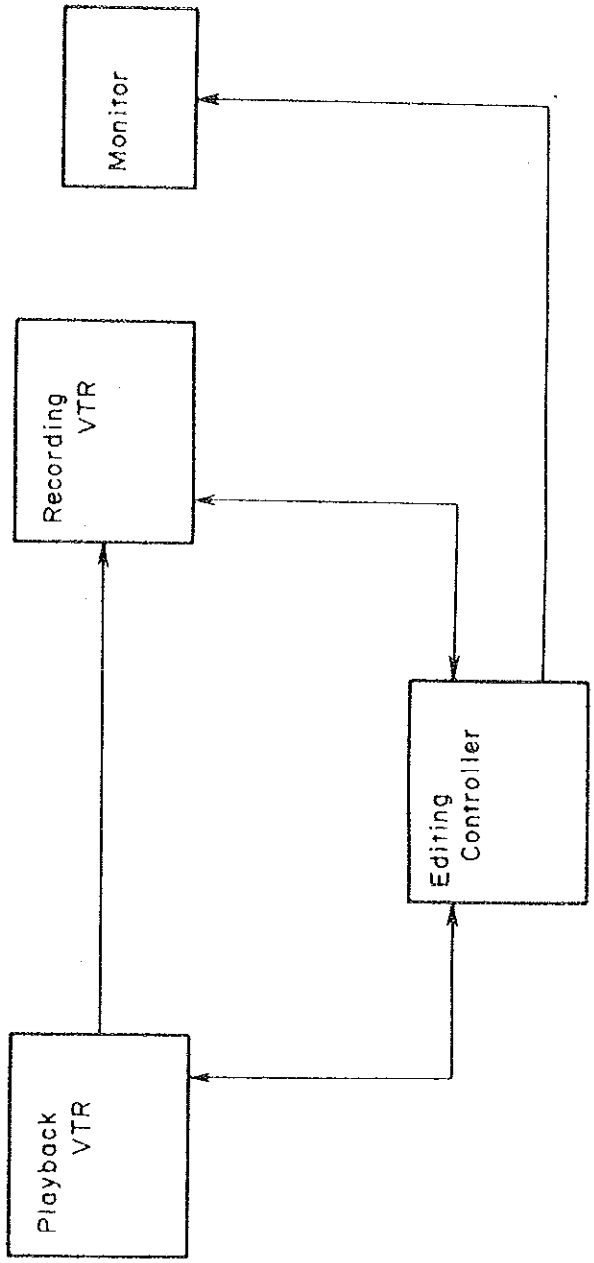
Layout of Equipment in Master Control Room 15



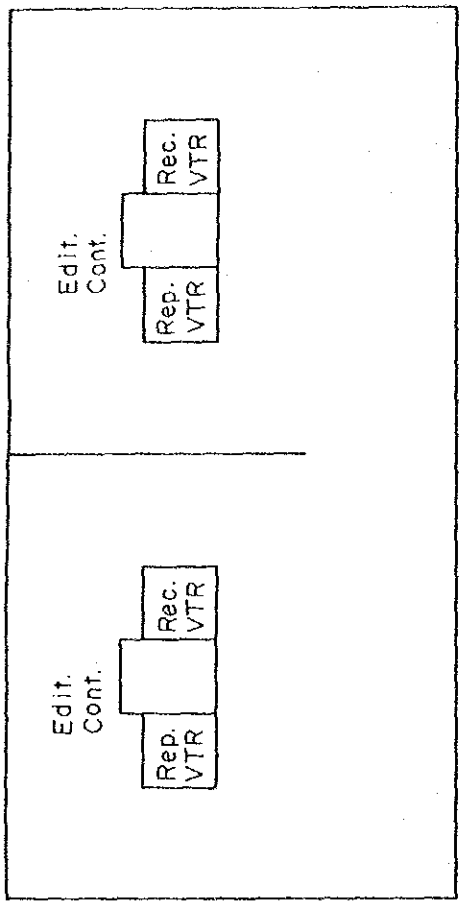
Block Diagram of
Telecine VTR Facilities 16



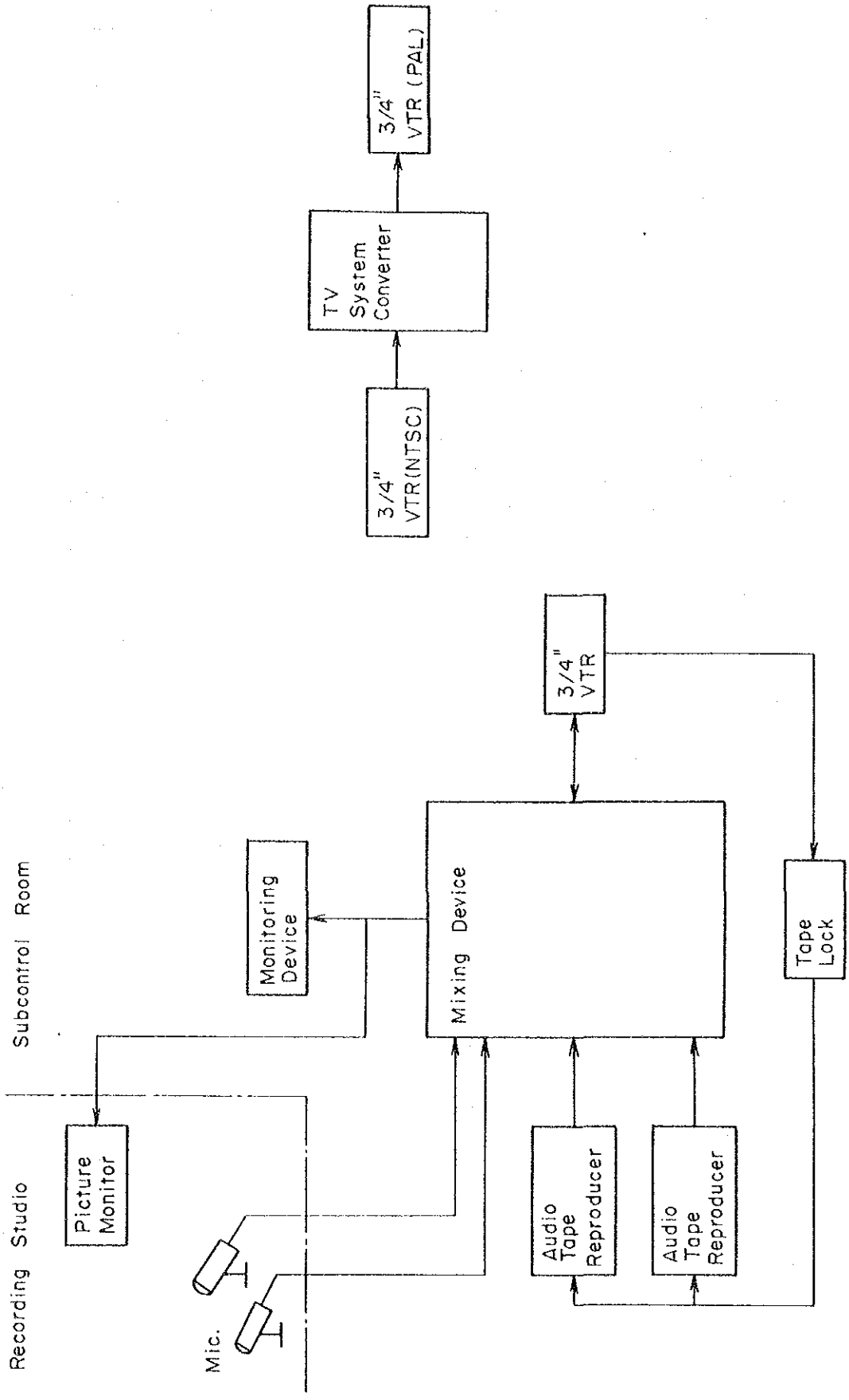
Layout of Equipment in Telecine/VTR Room 17



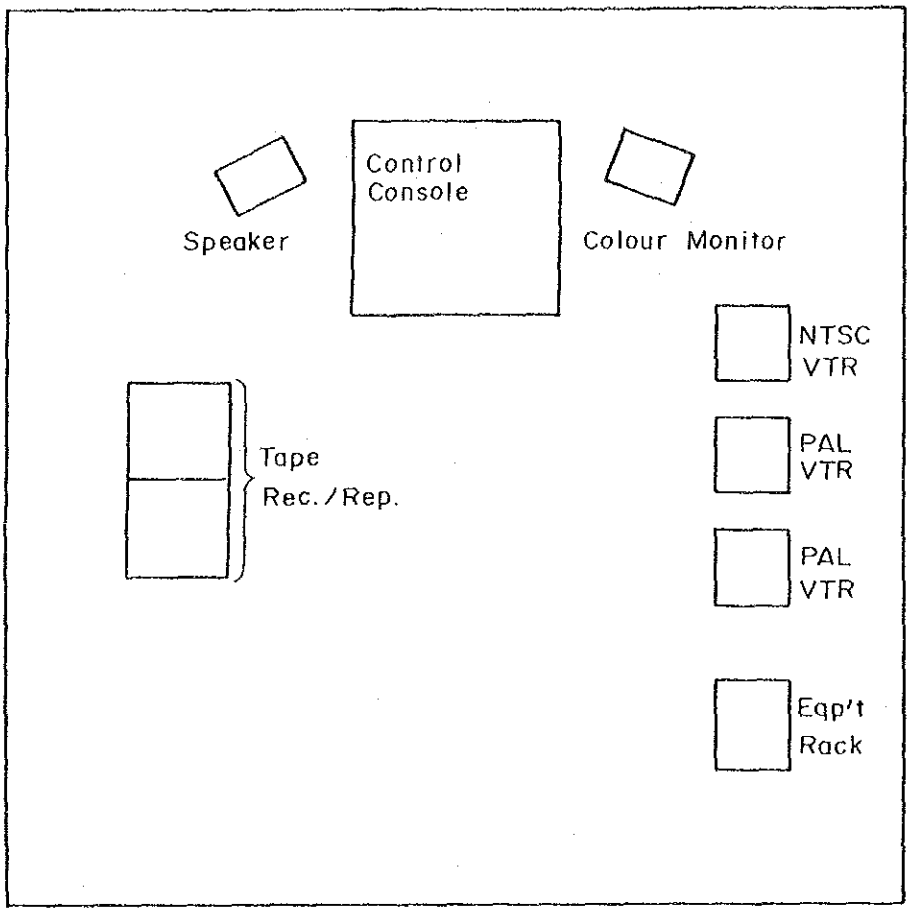
Block Diagram of Editing Equipment 18



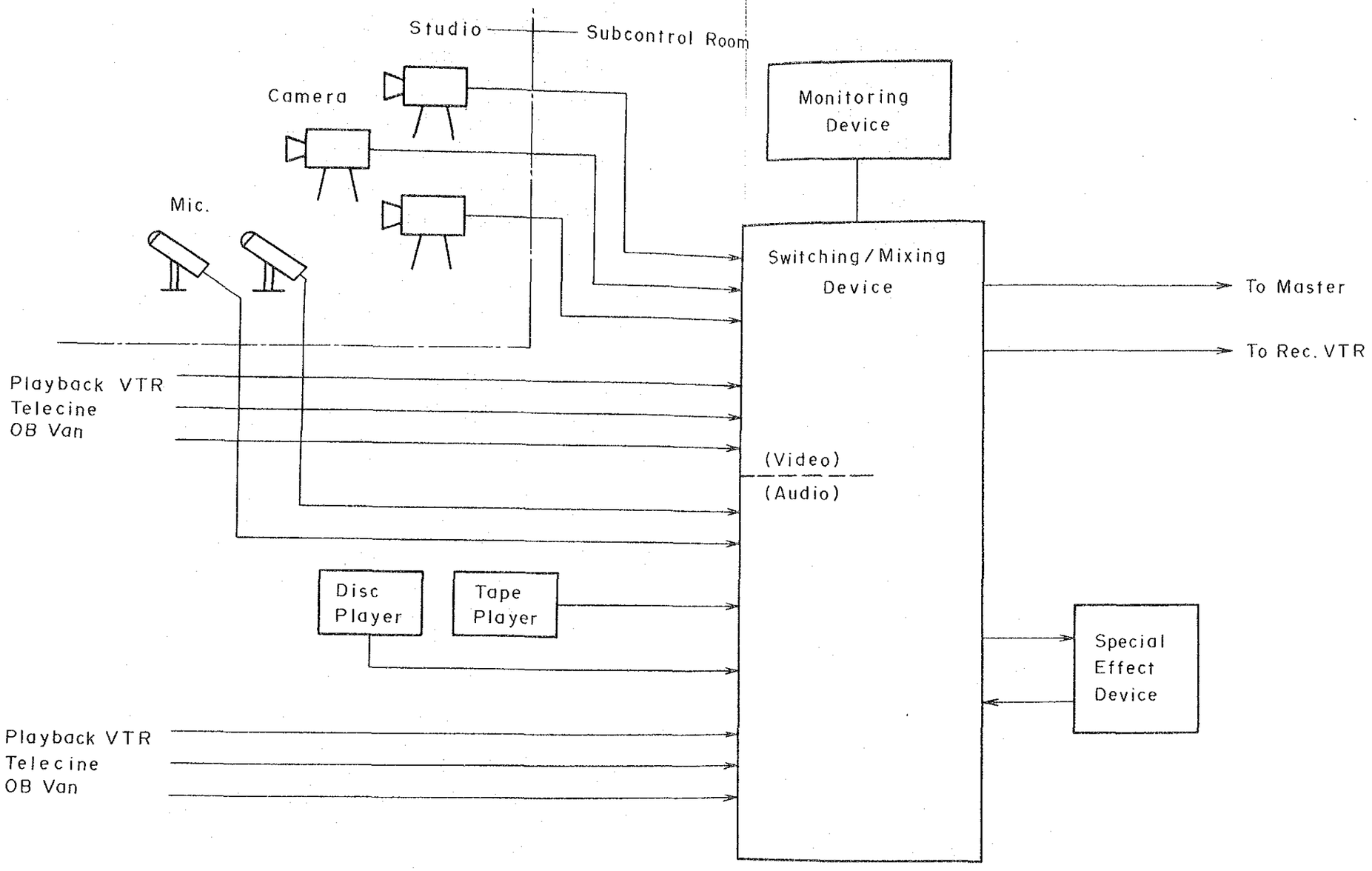
Layout of Equipment in Editing Room 19



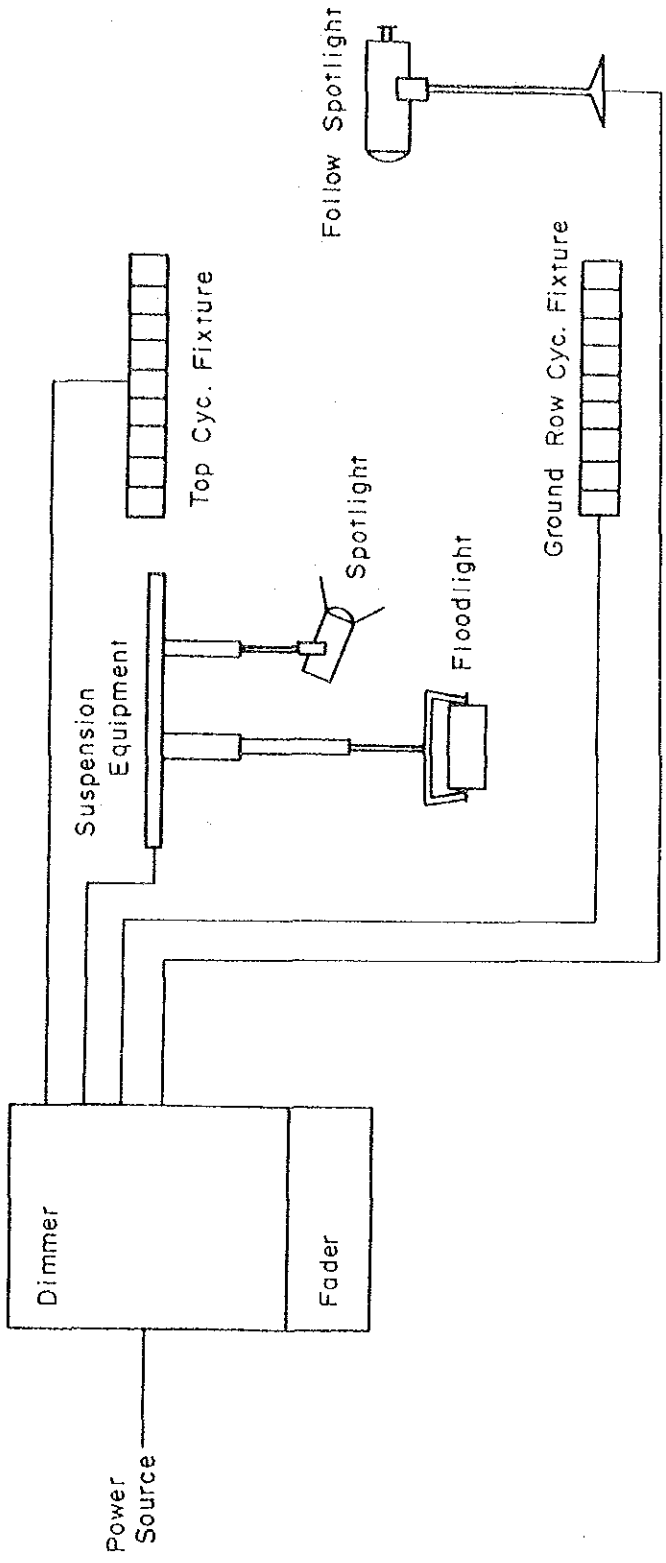
Block Diagram of Dubbing Studio 20



Layout of Equipment in Subcontrol Room for Dubbing Studio 21

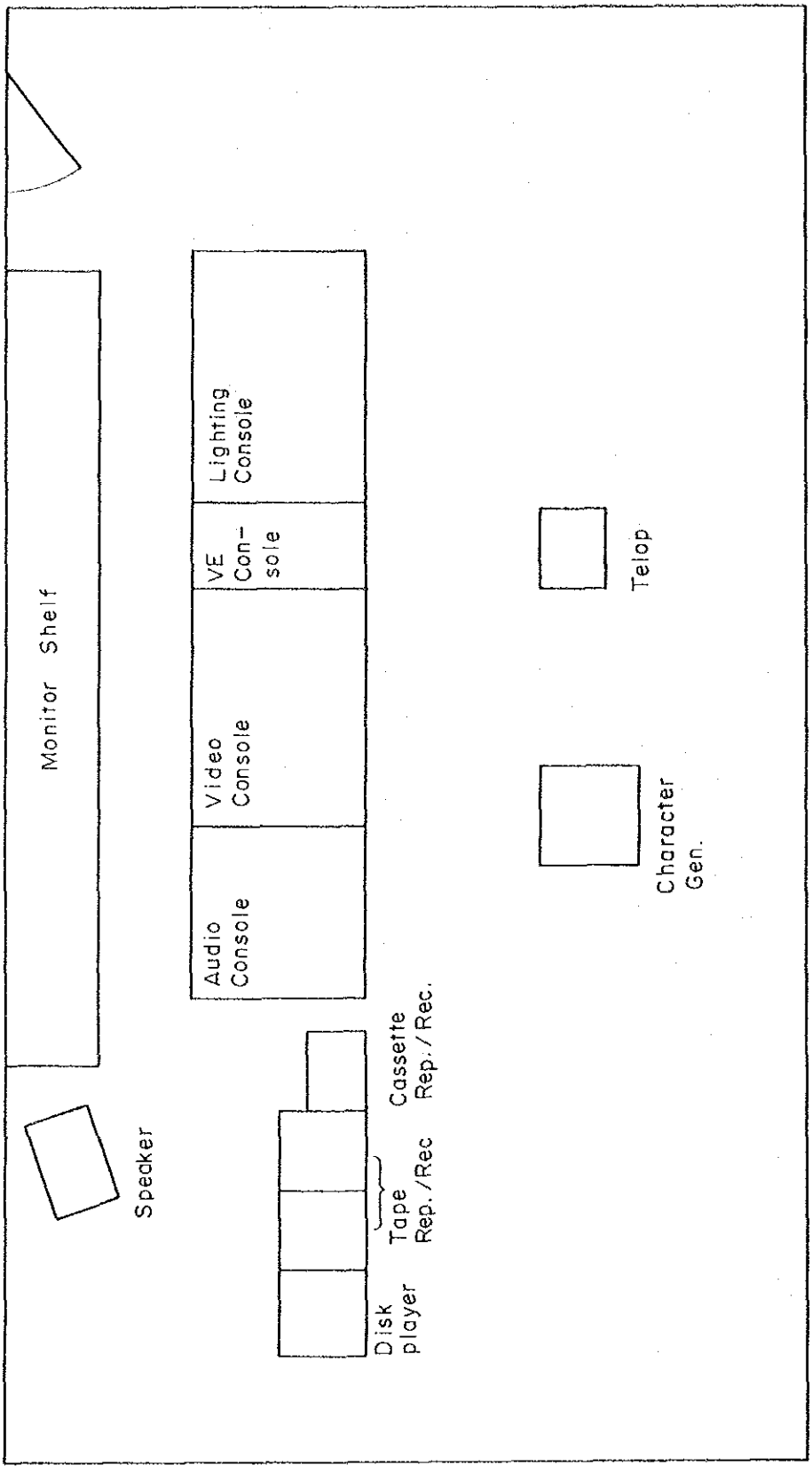


Block Diagram of
Subcontrol Room for Production Studio 22

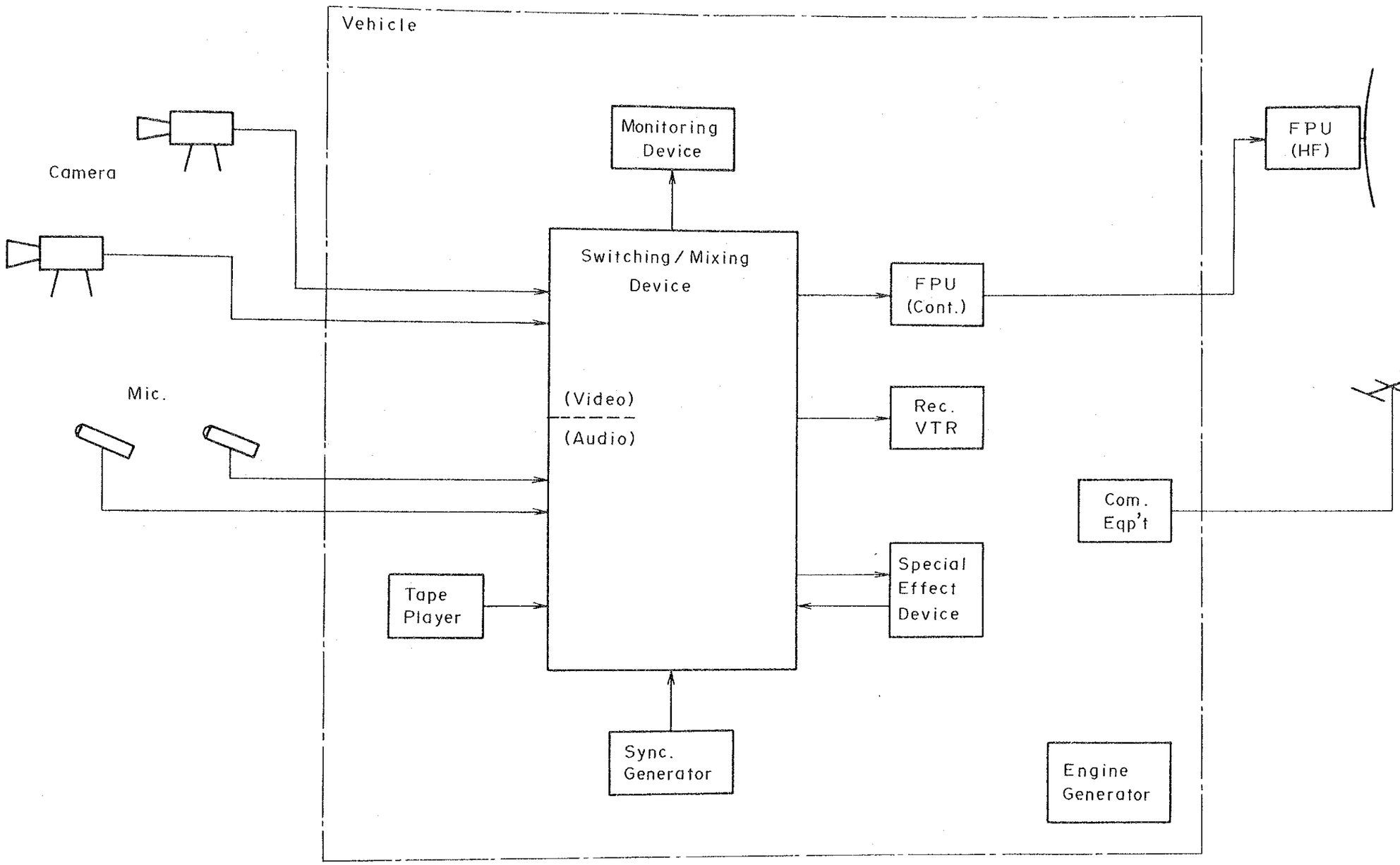


Block Diagram of TV Lighting System for Production Studio

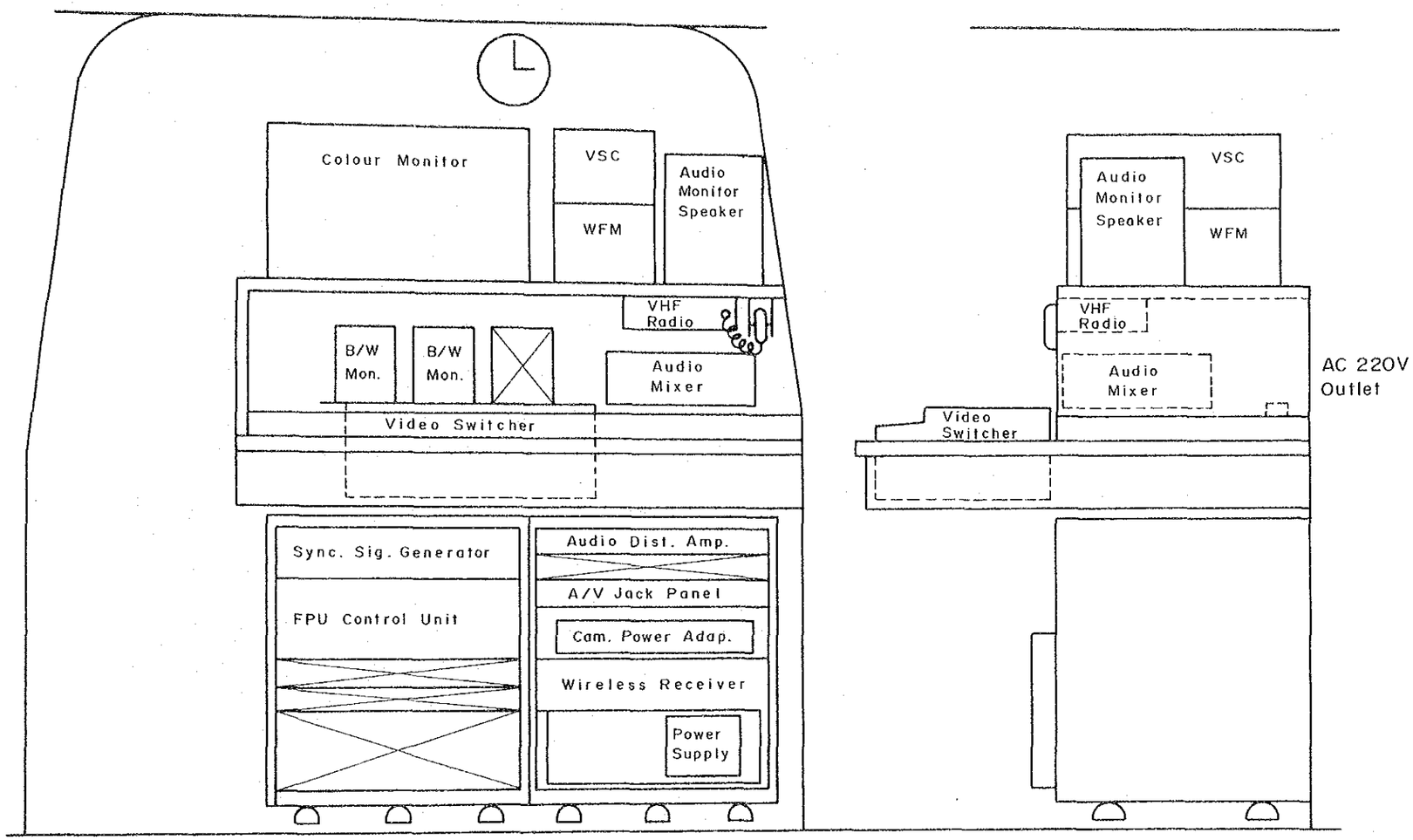
23



Layout of Equipment in Subcontrol Room for Production Studio 24



Block Diagram of OB Van 25



Front View

Side View

Layout of Equipment in OB Van 26

4-4 Execution Plan

4-4-1 Current State of Building Industry in Thailand and Construction Guidelines

(1) Current State of Building Industry in Thailand

In recent years many high-rise buildings have been constructed, in addition to medium and low buildings, in Thailand. Most of these buildings are reinforced concrete buildings. There are few buildings of steel-frame construction in Thailand. Low residential buildings are wooden, brick or block buildings.

Among very special buildings seen in Thailand are those with prestress concrete beams and floors. All in all, the capabilities of the Thai building industry are considered applicable to this project.

1) Earth work and pile foundation work

The soil of Bangkok and its vicinity, which lies in the basin of the Chao Phraya River, is characterized by a very soft alluvial layer (15 to 25 m deep) with N values of less than 10. Under the layer, there exist a hard silt layer and a relatively hard sand layer with N values of 30 to 40 (40 to 50 m deep). The lowermost layer is an alluvial layer consisting of concrete silt or sand (with N values of more than 50).

Remarkable land subsidence is a serious problem in Thailand, a solution to which is urgently needed.

Low-rise buildings generally employ the spread foundation, under which are crushd stone beds. On the other hand for, medium-rise buildings pile foundation is prevailing (15 to 25 m deep). Also for high-rise buildings with more than 20 stories, cast-in-place concrete pile foundation are adopted (40 to 50 m).

2) Reinforcing bars

Thai-made reinforcing bars are widely used in construction works. Bars with a diameter of 10 to 25 mm are most common. Also plain bars and deformed bars are manufactured in Thailand. Fabrication and assemblage works of reinforcing bars are well managed in Thailand.

3) Concrete work

Thai-made cement is widely used in construction works. Pit sand and crushed stones are common materials for fine and coarse aggregates.

Concrete is available in two ways; ready-mixed concrete delivered by transit-mixer truck and concrete production by batchar plant on the construction site.

Concrete maintains 28 days strength of 210 kg.f/cm^2 (Fc) are used for general buildings.

4) Forming work

Plywood panels are widely used for forms. Square wooden bars are usually used as support, and steel pipe support is gradually used as supplementary support. Precise forming works by local labour are not constantly available.

5) Masonry (Brick and concrete block work)

Bricks or concrete blocks are used for the exterior walls of the many reinforced concrete buildings.

6) Roofing work

In Bangkok, natural slate, corrugated slate and steel plate are usually used for roofing of medium and low-rise reinforced concrete buildings. Roof truss is generally composed of lumber, although

sometimes angle steel frames are applied. This may be because application of roof truss serves as effective heat insulator and steep roof inclination to be assured seems to be effective for draining heavy rain water often brought by showers.

7) Interior finish work

The ceiling is usually plywood coated with plywood emulsion paint. Also sound-absorbing asbestos board and wooden panel are used for the ceiling materials.

The ceiling bed is mostly wooden frame. The wall finish is generally mortar with paint finish. The partition is wooden bed framing with plywood panel. Wallpaper is seldom used for wall finish.

The floor finish is generally vinyl floor tiles. In hotel buildings and the like marble or terrazzo tiles are used in the entrance hall.

8) Exterior finish

The materials for external walls are concrete, brick or concrete block coated with mortar with paint finish.

The window frame is of generally steel or wood.
In recent years aluminum-framed windows have come into common use. Also jalousie glass windows are commonly used. Stainless steel window frames are seldom used.

9) Temporary work

Scaffolding is usually lumber. Steel putlog scaffolding and prefabricated independent scaffolding are sometimes seen.

4-4-2 Demarcation of Scope of Work

In this project the Government of Japan will be responsible for construction of the facilities of CH-11 and supply of necessary broadcasting equipment, and the Government of Thailand is responsible for site preparation/clearance, construction of the access road, arrangment of the infrastructure and administration and maintenance of the facilities, within the framework of the Government of Japan's grant aid.

The above-mentioned scope of work is stated clearly in the minutes of discussions dated July 31, 1986 and is confirmed by the Government of Thailand. In addition to the above, the Government of Thailand will be required to do some extra works concurrently with or prior to the construction work by the Government of Japan. These extra works are indispensable in executing this project smoothly.

(1) Works to be undertaken by the Government of Japan

1) Construction of CH-11 facilities

(a) Station building
(b) Transmitting tower

2) Supply of broadcasting equipment for use at CH-11

(a) Transmitting equipment

(b) Program sending equipment

(c) Program production equipment

(d) Master control equipment

(e) Record and reproduction equipment

(f) Editing equipment

(g) Dubbing studio

(h) Production studio

(i) OB Van

(i) Measuring equipment

(2) Works to be undertaken by the Government of Thailand

(a) Going through due formalities to implement this project

(b) Going through the customs formalities and tax examption

(c) Preparation of the infrastructure on the project site (electricity, water supply, sewerage, communication facilities and equipment, etc.)

(d) Preparation of the access road to the project site (to be completed before the commencement of construction work)

(e) Safe and effective custody and maintenance of the equipment supplied as part of the grant aid.

(f) Defrayment of construction and equipment installation costs not covered by the grant aid.

4-4-3 Execution supervision plan

In connection with supervising for the construction works, it is very important to maintain simultaneous and timely procurement of materials available in Thailand along with the construction schedule proceeds, to assure the materials' quality control and to establish the appropriate plans for transportation of materials and equipment to be procured in Japan

and other countries. These are very important factors in executing the quality and performance control and supervising the construction work. Also it is necessary to dispatch a resident engineer(s) to Thailand to facilitate smooth execution, in view of the degree of skill of local construction workers and the necessity to coordinate the construction works in compliance with local construction practices. It is also essential to establish a close linkage between the supervising system on the project site and the backup system in Japan.

Furthermore, it is very important in supervising to clarify the scope of each construction work, as well as the coordination work and the command system, as the responsible body for building construction differs from that of equipment installation.

The main supervising activities in this project are as listed below.

(1) Supervisory activities to be done in Japan

* Overall inspection of reports such as construction supervision reports and construction work reports.

* Approval of the execution plans, employment of local engineers, materials and equipment to be used, manufacturers, subcontractors, etc.

* coordination related to changes in design

* Factory inspection of Japanese-made materials and equipment

* Reporting to Japanese government agencies concerned

(2) Supervisory activities by experts dispatched to the project site

* On-site supervision of tests and technical guidance

* Inspection of the foundation and roof works at their completion and consummation

* Product inspection of local-made materials and equipment

* Guidance on technical instructions to be given on the site

* Inspection and approval of shop drawings

* Reporting to the client and assistance client's approval works

(3) Resident engineer's supervising work

* Routine supervising activities on the site

* Witness supervision of tests required

* Periodic inspection of each construction process

* Instructions including providing solutions to technical problems

* Regular reporting to the client and cooperation in client's approval works

* Recording of daily report on construction in progress

* Inspection of shop drawings

* Documentation and filing of instructions given on the site, meetings, matters arranged for, tests, inspections, etc.

4-4-4 Materials and Equipment Procurement Plan

Main materials should be procured in Thailand in principle. However, those materials difficult to procure in Thailand should be procured in Japan. Some construction materials or equipment and broadcasting equipment which presumed to be difficult to purchase or not produced in Thailand should be procured in Japan.

Materials and equipment for use in broadcasting equipment should be procured in Thailand wherever possible. However, broadcasting equipment and related installation works should be procured under the following plan.

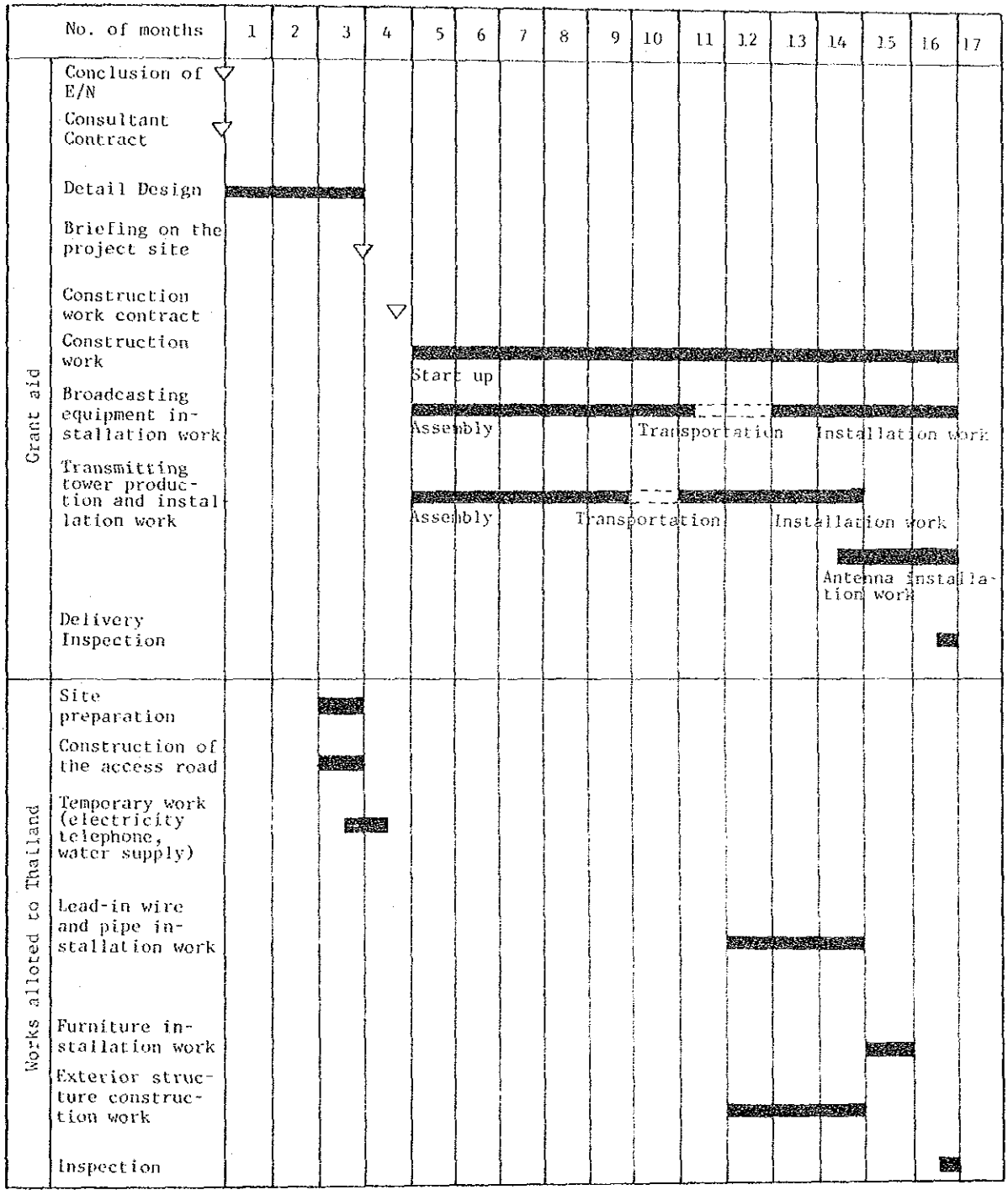
a) Broadcasting equipment (including the transmitting tower) and the materials and equipment necessary for its assembly, installation, as well as wiring and adjustment, should be procured in Japan.

b) Precast concrete piles, cement, sand, gravel, and other materials necessary for the foundation of the transmitting tower, and equipment necessary for its assembly, installation and adjustment should be procured in Thailand.

4-5 Execution Schedule

The term of works in this project is 12 months for the building construction and 4 months for the installation of broadcasting equipment.

The execution schedule is as shown in the table below.



4-6 Management and Maintenance Plan

To effectively and efficiently operate the facilities and equipment procured in this grant aid project, it is necessary to establish the station's own management and maintenance system. It is desirable that separate management and maintenance system be established for the station's building and the broadcasting equipment under the direct control of PRD.

In light of the scale and contents of the facilities, management and maintenance of the station building will not require services by a special facility management engineer. After its completion each department should select adequate personnel responsible for maintenance and inspection of the building and equipment. At the same time proper guidance should be given to other staff members and visitors as to the most efficient use of the facilities and equipment.

Calculation of the costs for operating and maintaining the CH-11 facilities and equipment is as shown below.

(1) Operation and Maintenance Cost for Building

The number of staffers responsible for facility management should be minimized since the selected equipment are mostly maintenance-free and automatically operated. In Japan, studies by the Japan Overall Building Energy Control Technology Association show that generally the floor area manageable by a person is 3,000 m^2 on the average. If two persons are to be employed for management in this project and their wages are to be 200 bahts a day, then the annual management cost can be calculated as follows.

2 persons x 200 bahts/day x 31 days x 12 months = 148,800 bahts/year
= 148,000 bahts/year

2) Water charges and heating and lighting expenses

These expenses can be calculated as follows.

a. Electricity charges

* Monthly electricity consumption

* Lighting in studios: (load) (demand ratio) (hours)
175 KW x 0.3 x 4 hours x 31 days = 6,510 KWH/day

* Broadcasting equipment: 300 KW x 0.7 x 10 hours x 31 days = 65,100 KWH/day

* Air conditioning equipment and general lighting:
400 KW x 0.5 x 8 hours x 31 days = 49,600 KWH/day

* Electricity cost

Electricity cost are calculated on the basis of MEA's power rates for large industrial users.

Basic rate: 750 KW x 90 bahts/KW = 67,500 bahts/month

Electricity assumption rate: 121,210 KWH/month x 1.43 bahts/KWH = 240,830 bahts/month

240,830 bahts/month x 12 months = 2,889,960 bahts/year

b. Water charges

Water charges are calculated on the basis of MWWA's rates.

Basic rate 30 bahts/month

Water assumption rate: 370 m^3/month x 4 bahts/m^3 = 1,480 bahts/month

1,510 bahts/month x 12 months = 18,120 bahts/year

Total cost of electricity and water:

2,889,960 bahts/year + 18,120 bahts/year = 2,908,000 bahts/year

3) Cleaning expenses

Cleaning work can be broadly divided into "daily cleaning work" and "periodic cleaning work."

"Daily cleaning work" includes floor sweeping, cleaning and supply of sanitary goods for lavatory/washroom and disposal of cigarette butts and waste paper. If the floor area to be covered by a person is 1,000 m^2 on the average, the total number of persons responsible for cleaning is:

2,797 m^2 - 1,000 m^2 = 3 (persons)

"Periodic cleaning work" is done regularly once a month. About 10 persons will be required for each regular cleaning work.

If the cleaning personnel's wages are 85 bahts a day, the total annual cleaning expenses can be calculated as follows.

3 persons x 85 bahts x 31 days/mont x 12 months = 94,860 bahts/year
10 persons x 85 bahts/day x 12 days/year = 10,200 bahts/year

Total: 105,000 bahts/year

4) Security expenses

The building is to be guarded every night by 2 guards.

If the guards' daily wages are about 130 bahts (overtime pay: 85 bahts x 1.5), the total annual security expenses can be calculated as follows.

2 persons x 130 bahts/day x 31 days/month x 12 months = 96,720 bahts/year
= 96,000 bahts/year

5) Repair expenses

* Building

Repair of interior/external finish should be done every 5 years. If the repair cost is 10% of the original interior/exterior finish work cost, the total annual repair expenses are:

113,000 bahts x 0.1 - 5 years = 226,000 bahts/year

* Building equipment

The building equipment's repair cost is generally about 1.5% of the original equipment procurement and installation cost. Then, the repair expenses for building equipment are:

19,750,000 bahts x 0.015 = 296,000 bahts/year

Total annual repair expenses: 226,000 bahts/year + 296,000 bahts/year
= 522,000 bahts/year

(2) Operating and Maintenance Cost for Broadcasting Equipment

The cost for operating and maintaining broadcasting equipment is generally about 1% of the total procured prices of equipment. In this project this cost, calculated based on the cost for procuring broadcasting equipment, is about 1,800,000 bahts. Broadcasting equipment is guaranteed for 1 year after completion of the broadcasting station.

The administration and maintenance expenses calculated in this way are summarized in the table below.

	Item	Building	Broadcasting equipment	Total
1)	Personnel expenses	148,000	-	148,000
2)	Water charges and lighting expenses	2,908,000	-	2,908,000
3)	Cleaning expenses	105,000	-	105,000
4)	Security expenses	96,000	-	96,000
5)	Repair expenses	522,000	-	522,000
6)	Administration and maintenance expenses	-	1,800,000	1,800,000
	Total	3,779,000	1,800,000	5,579,000

(3) Inspection and repair of the facilities

Locating to be inspected and repaired of the facilities are as shown below.

1) Exterior

* Repair of external walls: every 5 years
* Repair of roofing: Inspection: Once a year
  Other: every 5 years
* Inspection and repair of roof waterproofing:
  Inspection: once a year
  Other: whenever necessary
* Exterior fittings' painting: every 5 years
* Cleaning of drainage ditches and manholes: once a year

2) Interior

* Adjustment of fittings: once a year

3) Building equipment

Building equipment should be overhauled perodically and if necessary its abraded and exhausted parts should be replaced. Main equipment's length of durability is as shown below. Equipment no longer safe should be immediately replaced.

Main Equipment's length of durability

a. Electrical equipment

* Power transformer	30 years
* Switchboard	15 - 20 years
* Lighting fixtures	15 years
* Fluorescent lights	10,000 - 12,000 hours
* Incandescent lights	1,000 - 1,500 hours
* Switchboard (telephone)	15 years
* Public address system	10 - 15 years
* Fire alarm system	5 - 10 years

b. Water supply equipment

* Pumps	5 - 10 years
* Tanks	15 - 20 years
* Pipes and valves	10 - 15 years
* Sanitary porcelain	15 years
* Fire extinguisher	15 years

c. Air conditioning equipment

* Pipes	10 - 15 years
* Fan	5 - 10 years
* Package-type air conditioner	7 - 15 years

4-7 Approximate Estimate of the Project Costs

Approximate estimate of the project costs to be covered by Thai side is as shown below:

Project costs to be covered by Thai side:

1. Construction of the access road	372,000 bahts
2. Preparation of the infrastructure	116,000 bahts
Total	488,000 bahts

CHAPTER 5 EVALUATION

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5-1 Effect to be Expected

With the completion of CH-11 Station in Bangkok through this project, the following results can be expected:

a) It will be possible to provide broadcasting services that include news, current affairs, and national public relations programs produced by CH-11 to the metropolitan area with Bangkok as its center and its satellite cities located within 95km in radius (with a population of about 14 millions), and it will also be able to execute its obligation of national broadcasting in the Bangkok area.

b) CH-11 Station has been set to be the key station of the national television network of Thailand. Hence, it will become possible to transmit the programs broadcast from this station to the national local television stations simultaneously through TOT's nationwide microwave network.

Presently, Television of Thailand has been broadcasting the news programs produced by CH-9 in Bangkok (Mass Communications Organization of Thailand) for one hour a day (20:00-21:00) through TOT's nationwide micro wave network.

After completion of CH-11 Station, CH-11 will be in charge of the production and broadcasting of these news programs which will be broadcast simultaneously nationwide 5 times a day totalling 4 hours of programing.

It will also be possible in view of the equipment provided to carry out nationwide and simultaneous broadcasting of programs of important national events, sports, education and culture, etc., and emergency broadcasting to the entire nation will also be possible. Accordingly, CH-11 will occupy an important position from a viewpoint of the nation as a whole.

c) CH-11 will be able to provide its outside users such as STOU, RU, Ministry of Education, Ministry of Agriculture and Cooperative, Kasetsart University, etc. with broadcasting time required for the Bangkok area.

These outside users are conducting or planning the production and broadcasting of educational and cultural programs, but it is very difficult to secure sufficient broadcasting time in the Bangkok area. Therefore, they strongly desire the establishment of a national television station operated on a noncommercial basis in Bangkok. A basic understanding on time allocation has been settled between CH-11 and these various organizations. And the time allocation is also expressed in the program transmission table which will be used after the completion of this station.

Taking a look at the present status of STOU, they are now broadcasting educational programs 1.5 hours a day to the Bangkok area through CH-9, but 5 hours of broadcasting time is required to organize the curriculum, thus lacking 3.5 hours. Accordingly, it is clear that they are facing a serious difficulty in carrying out their mission.

As also expressed in the program transmission table (temporary), CH-11 is supposed to give enough broadcasting time to STOU to enable STOU to perform its original mission.

In addition, EBPC, which was established as the STOU broadcasting program production center in 1984 by grant aid assistance from Japan, is now a core organization for education program production activities in Thailand and this center has sufficient production capability. However, they can not carry out their own functions well because of the small time allocation to STOU in the Bangkok area. After completion of CH-11 Station through this project, STOU will be able to secure the broadcasting time originally required, and full-scale activities by EBPC will be possible as well. Hence the grant aid assistance from Japan will be even more fruitful.

d) Extensive knowledge can be gained by broadcasting overseas produced programs as educational and cultural programs. This knowledge can hardly be obtained by domestically produced programs, and the foreign programs are also an effective means to promote mutual understanding between the peoples of various countries.

CH-11 is also planning to conduct program exchanges with foreign countries and the broadcasting of overseas programs. In this case the following problems can be predicted.

Language: It has been made a rule in Thailand that broadcasting should be done in Thai.

TV system: The programs produced with a different TV system have to be converted to the PAL-B system employed in Thailand.

With the equipment provided under this project, these problems can be solved and it will be possible to broadcast overseas programs in a positive manner and to exchange programs with foreign countries.

5-2 Operation and Control of CH-11

a) Securing of Staff

Presently, the first executive director of CH-11 has already been appointed, and the practical and experimental station has been operated with 65 staffers. Also, it is scheduled to increase its staff to about 180, 3 to 4 years after the full-scale operation has begun with the completion of this project.

It takes a certain amount of time to train the staff members to work effectively after their employment because skill and experience are required. Thus, how to secure the necessary 120 staffers becomes a problem. For this, PRD thinks that there are many staff with much experience and knowledge in local television stations because of their long history of operating of local television stations. PRD is now planning to cope with this personnel problem by transferring the above well-experienced staff to CH-11 and, in turn, replacing them with the newly recruited

persons, by transferring members within the HQ, and by recruiting new staff for CH-11.

Each station will not be overloaded if the plan is executed in such a way so as not to create a lack of skillful persons. Hence this method is considered practical and reasonable. In addition, daily training and intensive training are also of importance, and sending some staff to Japan for training is now under careful consideration.

PRD has been operating the present CH-11 practical and experimental station since Autumn of 1985, and broadcasting for 4 and a half hours a day as of August 1986.

News programs have been broadcast as a mainstay of the self-produced programs, during which the staff members can gain precious knowledge and experience in operations and control, which cannot be obtained in a short training course, so as to be a strong and reliable force to initiate the full-scale operation. With enough knowledge and experience obtained during operation and control of the local stations for many years, it is considered that PRD is best suited for executing the above.

b) Funding Plan

In the cabinet decision adopted on May 6, 1986, CH-11 was designated to be a national television broadcasting station which does not broadcast any advertisements at all. Accordingly, its main source of income is the air time charge paid by outside users who want to televise educational and cultural programs such as STOU for example.

According to the PRD's estimate, the air time charge paid by outside users will be 15,400 Bahts per hour, and this charge is quite low priced in comparison with the 22,500-25,000 Bahts an hour paid by STOU, etc., to CH-9. Thus it is considered that users can be easily secured. From these estimates, according to the trial calculations made by PRD, an annual balance sheet for CH-11 would be an income of 56,210,000 Bahts and expenditures of 53,957,750 Bahts, hence it is considered that CH-11 can be operated soundly.

In addition, the staff members of CH-11 are national public servants, thus their personnel expenses are appropriated from the national budget.

As for the operating system of CH-11, PRD is planning to establish a Program Organizing Committee composed of the PRD staff members and representatives from the outside users after completion of this project, to realize the basic policy of the broadcasting. By doing this, it is expected that the nature, operating costs, manning, etc., of CH-11 as a public service station will be clearer and the operating system will be successfully established.

There are 4 independent television stations in Bangkok, and they are broadcasting their own programs.

These stations, however, are operated on a commercial basis, thus it has become difficult for the public educational organizations to broadcast their educational and cultural programs through these 4 stations, since it is impossible to secure sufficient air time.

The education and public services broadcasting station CH-11 constructed through this project is different from the other 4 existing stations in purpose, management system, broadcasting program, etc., and it is greatly expected that the problems which Television of Thailand is now facing can be solved by establishment of this television station.

A great expectation of the Thai people can be satisfied by Japanese cooperation through this project, and its results will be great. Consequently, it is concluded that execution of this project by a Japanese grant aid is very appropriate and reasonable.

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

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Conclusion

As stated in the preceding chapter, this project formulated at the request of the Government of Thailand is one of great social significance and is expected to exert a great effect in the areas of education and public information service, in Thailand after its completion. This project will greatly contribute to the full functioning of the nation's state-run television broadcasting and the subsequent social and cultural advancement of the nation.

At the same time, the following proposals which have resulted from the basic design study conducted as part of this project should be seriously examined so that this project may fully attain its objectives.

Recommendations

1. The full-scale CH-11 station should fulfill its role not only as a key station in the nationwide television network, but also as a pivotal place for in-service training for and exchange of views and information by local stations' staffers.
2. The existing CH-11 facilities should be repaired and improved so that they may serve as a place for the above-mentioned training and exchange of views and information.
3. The Government of Thailand should work out an efficient program to promote the dispatch of Japanese experts to Thailand and the dispatch of Thai staffers to Japan for in-service training.
4. Exchange of programs with foreign organizations should be enhanced including provision of programs through Japan's cultural grant aid.
5. The temporary program production committee should continue to hold meetings regularly so that exchange of views and information among the organizations concerned may be further promoted.