

#### 4-3-2 Architectural Designs for the Studio Building

##### (1) Floor Plan

###### 1) Functions and Scales of the Rooms Required

###### a) Studio

As mentioned in 4-2, the studio shall be of a minimum size as a medium-scale studio, with an effective interior area of about 150m<sup>2</sup>. In consideration for soundproof during recording, a studio anteroom with 5m<sup>2</sup> in space shall be provided.

###### b) Sub-control Room

Following the plan of the existing studio, the sub-control room shall be located adjacent to the studio, with windows on the studio side.

Its area and shape shall be determined in accordance with the equipment layout as set forth in the broadcasting equipment plan.

It shall be about 50m<sup>2</sup> in area, as per the layout shown in Fig. ST-5.

###### c) Master Control Room

The same as in the case of the sub-control room, its area and shape shall be determined in accordance with the equipment layout as set forth in the broadcasting equipment plan. Based on the layout shown in Fig. ST-7, it shall be about 70m<sup>2</sup> in area.

###### d) Announcer Booth

For use in producing news and small-scale programmes, this booth shall be located adjacent to the master control room.

It shall be a small studio equipped with two cameras and a set of fixed lighting equipment. Based on the layout shown in Fig. ST-7, it shall be about 30m<sup>2</sup> in area.

###### e) Editing Rooms

A total of four videotape editing rooms shall be provided. Each of these rooms shall be of a minimum size as an editing booth, 8-9m<sup>2</sup> in floor area.

- f) Tape-copying Rooms  
The same as in the case of the existing facility, the tape-copying room shall be about  $15\text{m}^2$  in space, since the equipment to be used is mainly the VCRs currently in use. Two rooms shall be provided, of which one shall have about  $40\text{m}^2$  in total with an additional space of about  $10\text{m}^2$  to provide space for storage of tapes and about  $15\text{m}^2$  for installation of telecine equipment.
- g) Dimmer Unit Room  
This is the room to accommodate the dimmer unit rack of the studio lighting. The room shall be located on the top floor. As a space to accommodate equipment, about  $20\text{-}25\text{m}^2$  will be required but in consideration of an additional space for the access to the rooftop for maintenance purpose, the total floor area of about  $30\text{m}^2$  shall be required.
- h) Electronic Field Production (EFP) Room  
This room is for use in storing VCR equipment, cameras and other instruments for outdoor videotaping use. To enable two persons to be engaged in the maintenance work, about  $20\text{m}^2$  ( $2\text{ persons} \times 10\text{m}^2/\text{person}$ ) shall be required as a work space.
- i) Scenery Area  
In the case of a medium-size studio for use in producing such programmes as dialogues and lectures, provision of a storage space for stage settings with about a half of the floor area of the studio is generally considered as a standard (Vol. 1 of the Broadcasting Technology Series, edited by NHK Publishing Co.). So, in this case, a storeroom of about  $60\text{m}^2$  in floor area shall be provided.
- j) Platform  
As a space in which repairs of stage settings and stage props are done, a platform shall be provided adjacent to the exterior of the Scenery Area. It shall be approximately  $2\text{ workers} \times 10\text{m}^2/\text{person} = 20\text{m}^2$  in area.

k) Camera Store

This shall be located adjacent to the studio, so that the cameras may be stored directly into the storeroom from the studio after their use each day. It shall be of a minimum size with a floor space of about 10-15m<sup>2</sup>.

l) Make-up Room

Two rooms shall be provided, one each for men and women. A minimum necessary space of about 10m<sup>2</sup> each for men and women shall be provided, since this studio shall not be used for production of full-scale dramas.

m) Staff Room

An office in common for 5 section chiefs responsible for telecine, audio dubbing, editing, tape copy and studio sections shall be provided. Its size shall be about 5 persons × 6m<sup>2</sup>/person=30m<sup>2</sup>.

n) Conference Room

This shall be for use by a maximum of 10 persons, including producers, engineering staff and cameramen, to discuss programme production. So, its size shall be about 10 persons × 3m<sup>2</sup>/person = 30m<sup>2</sup>.

o) Director's Room

As an office for the top executive responsible for the running of the TV broadcasting station, a room of about 10-15m<sup>2</sup> in floor space shall be provided.

p) Maintenance Room

In this room, the maintenance and repair of broadcasting equipment will be conducted. It shall have a space of about 2 workers × 10m<sup>2</sup>/person = 20m<sup>2</sup>.

q) Air-conditioning Machine Room (ACMR)

For exclusive air-conditioning of the studio and announcer booth, the air-conditioning machine room may be positioned at an appropriate location adjacent to these two rooms.

According to the layout of the equipment, the total floor space shall be about 90m<sup>2</sup>.

r) Electricity Room

Equipment such as the main switch, distribution board, etc., shall be accommodated in this room. Considering the space required for equipment layout, the room shall be about 15m<sup>2</sup> in area.

s) Waiting Area

Using a corner in the 1st-floor corridor, a waiting area of about 10m<sup>2</sup> shall be provided. The space shall be surrounded with glass panels and shall adjoin the flower-beds outside.

t) Other Common Spaces

The layout for the common spaces, such as toilets, corridors, staircase, entrance hall, etc., shall be planned in such a way as to secure smooth paths of flow in accordance with the functions and scale of the building.

2) Layout Plan for Each Room

The studio shall be positioned at the centre of the building, taking into account the need for shielding from exterior noises and the efficiency of the air-conditioning for the studio, so as to minimize the area of the wall surfaces that are in direct contact with the outside. The sub-control room shall be located adjacent to the studio, and on the western side of the studio shall be positioned the main equipment rooms in which various units of broadcasting equipment are to be installed, such as the master control room, editing rooms and the aforementioned sub-control room. The scenery area and the camera store shall also be located adjacent to the studio, so as to facilitate access from the studio. These rooms shall be positioned on the northern side of the studio, together with the air-conditioning machine room for the studio. On the eastern side of the studio, such rooms as the maintenance room, EFP room and electricity room shall be located, so as to enable the personnel in charge of the OB van and maintenance to have their own access to those rooms.

On the southern side of the front of the building will be the workroom zone including such rooms as the make-up room, conference room, director's room and staff room as well as the entrance. Furthermore, near the broadcasting equipment room zone and the workroom zone, both of which are most frequented by people, a common space, including toilets, staircases and corridors, shall be positioned. The following is a conceptual sketch of the above-mentioned zoning.

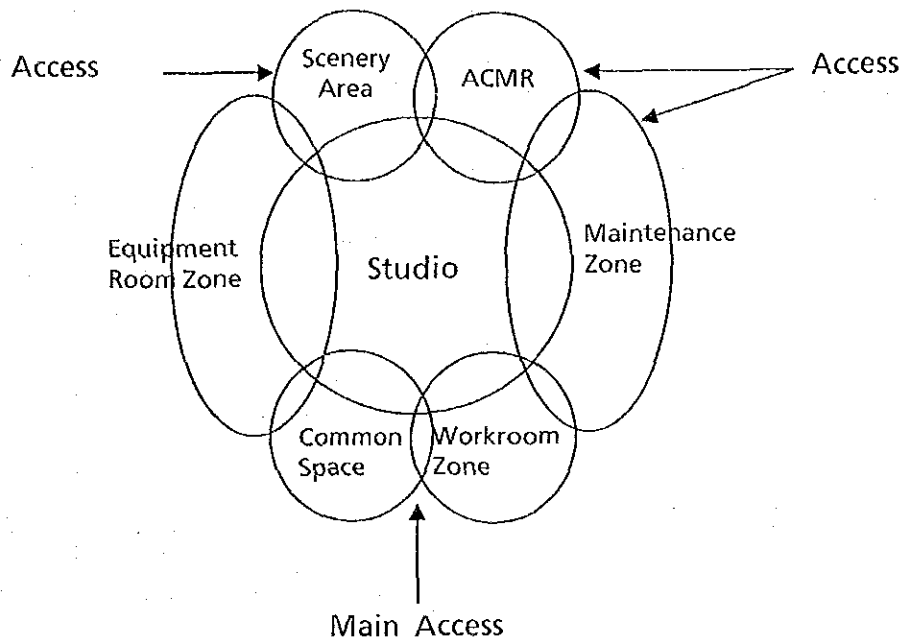


Fig. 4-3-2 Outline of Zoning of the Building

### 3) Floor Area and Ancillary Facility of Each Room

The floor plan of the new building is given in the plan of the basic design diagram shown in 4-3-4. The area of each room and the outline of the ancillary facility of the rooms are shown below.

Floor	Name of Rooms	Area (m <sup>2</sup> )	Ancillary Facility	Area of Existing Studio Building (m <sup>2</sup> )
1st	Studio	159.00	Grid pipes	112.00
	Studio Anteroom	5.28		—
	Sub-control Room	48.95	Trench for wiring, window	12.80
	Scenery Area	63.35		—
	Camera Store	12.90		—
	EFP Room	18.05		7.50
	Maintenance Room	20.05		15.50
	Make-up Room	23.02	Make-up counter, washbasins	—
	Staff Room	32.22		—
	Conference Room	30.21		—
	Director's Room	12.12		24.70
	Waiting Area	9.00		—
	Storeroom	6.86		22.30
	Air-conditioning Machine Room	60.90		—
	Electricity Room	13.83	Cable trench	
	Toilets	22.67		(Outside)
	Tea Kitchen	8.94	Stainless steel sink, hanging cupboard	—
	Corridors	87.65		36.00
	Entrance Hall	19.32		22.00
	Staircase	12.48	Space for pumps provided under the stairs	—
Platform	18.72		—	
Parking Lot for OB Vans	22.68		(Outside)	
	(Total Area of the 1st Floor)	708.20		
2nd	Main Control Room	69.08	Trench for wiring, peep-in window	10.80
	Announcer Booth	30.90	Grid pipes	17.20 *Note1)
	Editing Room (1)~(4)	34.50		46.80
	Tape-copying Room (1)	16.58		9.30
	Tape-copying Room (2)	39.70		18.60 *Note2)
	Corridors	19.12		—
	Staircase	12.60		—
	(Total Area of the 2nd Floor)	222.48		
3rd	Dimmer Unit Room	30.80		—
	Staircase	18.00		—
	(Total Area of the 3rd Floor)	48.80		
Area	(Total Floor Area)	979.48		323.30
	(Total Building Area)	787.76		

\*Note 1) The space corresponds to the audio dubbing room.

\*Note 2) The space includes the telecine room (15.00m<sup>2</sup>)

(2) Section Plan

For functional reasons a studio, unlike ordinary offices, requires a high ceiling. In other words, in the case of this studio, as shown in the section drawings of the basic design drawings, the height of the cyclorama, which serves as the backdrop of scenes to be shot, comes to as high as 4.0m, and above it are the grid pipes from which the lighting equipment are hung and ceiling. In addition to these, there are, above the cyclorama, the space for air-conditioning ducts and structural beams. Thus the actual height of the studio will be as much as 8m which corresponds to two to three stories. As mentioned in the section explaining the floor plans, it is desirable to position the studio in such a way as to have it be enclosed by other rooms, from the point of view of acoustics and for the purpose of economizing on air conditioning. Therefore, of the equipment-room zone mentioned earlier, the rooms related to tape-editing and programme sending-out, such as the master control room, announcer booth, editing rooms and tape-copying rooms, shall be provided on the first floor. The announcer booth shall be provided adjacent to the master control room.

In Vientiane, where both the temperature and humidity are high, a considerable amount of rainfall is recorded annually during the rainy season. Flat roofs with waterproof layers are not in common use and most of the buildings adopt the building method of constructing the roofs covered with either corrugated asbestos cement sheets or roof-tiles which are supported by the roof truss. When this construction method is adopted, no waterproof layer would be required on the roof. Besides, in Laos, there is no one specializing in waterproofing work. Therefore, in the present case, the sloped tiled-roof shall be mainly adopted, following the construction method generally used in the Lao PDR. Hence, a roof incline of at least 20° will be required, and the entire roof shall be so built as to cover the whole building including the workroom zone and the maintenance zone on the first floor and the air-conditioning machine room on the northern side, all of which are so positioned as to surround the studio in the centre of the building. Because of the structure of the roofs, the equipment-room zone would be able to secure a space corresponding to three floors. Therefore, that space shall be used as the dimmer unit room. And upon the roof slab, which is to be the structure built on top of

the building, shall be constructed a steel tower for the programme transmission link.

(3) Structural Design

1) Structure System

The structure of the main body of the building shall be of a reinforced concrete rigid framed structure which is considered most suited for this type of building. The roof beams of the studio portion where the spans will be relatively large shall be of steel structure. The nature of the soil of the project site is quite good and the ground there can be expected to serve as an ample supporting layer at the depth of 1-1.5m; the foundation of the building shall be an independent foundation of direct foundation type.

2) Loads, External Forces, etc., Required for Structural Design

a) Dead Load

Besides the weight of the building itself, the total weight of the steel tower for programme transmission and the parabolic antenna, both of which are to be installed upon the roof, shall be taken into account.

b) Live Load

Appropriate standards shall be set for each room, in accordance with the calculation standards of the Architectural Institute of Japan concerning reinforced concrete structures and the load of the broadcasting equipment to be actually installed in the facility.

c) Wind Load

The wind velocity of 37m/s, the maximum velocity recorded (May 1983) in Vientiane during the last 20 years, shall be adopted as the design standard for calculation of wind velocity.

d) Earthquake Load

According to the past earthquake data recorded in the city of Vientiane, the strength of earthquakes has been small and the



frequency also has been very low. In fact, in the map published by the research institute of the Ministry of Construction in Japan, a map showing the degrees of earthquake risks in the earthquake-prone regions of the world, the horizontal seismic intensity in the Lao PDR from the viewpoint of architectural design is stated as being negligible. Therefore, the earthquake load shall not be taken into account in particular.

e) Bearing Capacity of Soil

Based on the data obtained by Lao National Television through its geological survey conducted on the project site, the bearing capacity of soil for designing use shall be 20ton/m<sup>2</sup>.

3) Structural Design Standards

With regard to building structure design, no design standards of the Lao PDR's own have yet been established. Therefore, the structural design for the building shall be in accordance with structural standards in Japan.

(4) Building Equipment Plan

1) Electrical Installations

a) Power-receiving and Sub-station Installations

Commercial power shall be received through the 22kV, 50Hz power transmission line that runs along the road on the southern front of the building. The securing of the branch route, installation of a transformer (pole-top truss) and the connection to the switchboard inside the building shall be conducted by the national electric company in the Lao PDR.

The 3-phase 4-wire 380V/220V, 50Hz power is received in the electricity room, so that the power may be supplied to various units of equipment, such as AV equipment, lighting fixtures, switches, socket outlets and air conditioning/ventilation equipment.

The power-receiving capacity is anticipated about 310kVA according to an estimate made as follows:

General lighting and plugs	60kVA
Driving power	160kVA

Studio lighting	100kVA
Lighting in the announcer booth	20kVA
Power source for the studio	46kVA
<hr/>	
Total	386kVA

$$386 \times 0.8 \text{ (demand factor)} = 309\text{kVA} \rightarrow 310\text{kVA}$$

b) Trunk Line and Power Line Installations

From the viewpoint of construction plans, the distribution method to be adopted for the trunk lines and power lines shall consist mainly of the cable and cable-rack system; the use of steel conduit pipes shall be avoided as much as possible.

c) Lighting Fixtures

Fluorescent lamps shall be used as the main source of light. The luminance and the type of instrument for each room shall be as follows:

- Control rooms, 400 lux, Ceiling-embedded type  
conference room,  
staff room, etc.
- Electricity room, 200 lux, Exposed direct type  
air-conditioning  
machine room, etc.
- Corridors, toilets, etc. 100 lux, Ceiling-exposed type
- Studio (excluding 20 lux, Ceiling-exposed type  
studio lighting)

d) Switches and Socket Outlets

Other than those for general use, the circuits for specific uses, such as for air conditioners, shall be fixed.

e) Automatic Fire Alarm System

This shall not be considered in particular.

f) Telephone Piping Installation

Piping and installing of outlets shall be conducted at the

locations that are considered necessary in each room.  
The leading-in of telephone lines and wiring inside the rooms shall be taken care of by the national telephone company.

g) Earthing

Earthing shall be provided for all of the low-voltage equipment, AV equipment and telephones.

h) Lightning Precautions

Lightning rods shall be set up in order to prevent damage to the building by lightning.

2) Water Supply, Drainage and Sanitary System

a) Water Supply

A water-pipe, branched out from the main pipe laid under the south-side road (public road), shall be lead into the site by the Lao side and shall be connected to the gate-valve. Because of inadequate water pressure, the water shall first be stored in the receiving tank and then supplied to different stopcocks by means of pressure water supply devices.

b) Drainage System

The wastewater and sewage from the building shall be driven out through separate piping systems to be treated in a combined septic tank and a soak pit.

c) Sanitary Fixtures

Each toilet shall be equipped with such auxiliary items as western style toilet stools, urinals, wash basins, toilet racks and mirrors.

3) Air-conditioning and Ventilation System

a) Outline of Air-conditioning System

The air-conditioning system is very important in appropriately maintaining the environmental conditions for broadcasting equipment. Since any stoppage of the system caused by failures or other reasons would be a serious

obstruction to normal operation of the studio, air-cooled package-type air conditioners which have high reliability, maintainability and economy, shall be adopted for the studio and announcer booth. The rooms for broadcast operations are generally unspecified in the hours of their usage. So, the air-conditioning equipment shall be appropriately assigned to serve different rooms efficiently through separate operation at different hours of the day. In the case of the single-duct type air-conditioning equipment, air-supply and ventilation ducts for the studio and announcer booth shall be installed and, in designing it, every care shall be taken to ensure that the rooms are protected from noise and vibration.

b) Design Conditions of Air Conditioning

Based on the meteorological data from the Ministry of Agriculture of the Lao PDR, the design conditions for the air-conditioning system shall be as follows:

① Outdoor Temperature and Humidity  
33.5°C D.B. (dry-bulb temperature)  
70% R.H. (relative humidity)

② Room Temperature and Humidity  
26 ± 3°C D.B.

③ Rooms to be Air-conditioned and Loads

The air conditioning shall be cooling only and shall be applied to the studio and other rooms as follows. The equipment loads due to broadcasting equipment and lighting equipment, and the number of personnel working in each room, shall approximately have the following values as the standards:

<u>Name of Room</u>	<u>Equipment Load</u>	<u>Lighting Load</u>	<u>Personnel</u>
Studio	—	70kW	25
Sub-control Room	8kW	30W/m <sup>2</sup>	3
Announcer Booth	—	8kW	5
Master Control Room	10kW	30W/m <sup>2</sup>	5
Editing Room	4kW (1kW×4)	30W/m <sup>2</sup>	3
Tape-copying Room	4kW (2kW×2)	20W/m <sup>2</sup>	3
Dimmer Unit Room	5.3kW	20W/m <sup>2</sup>	0
EFP Room	—	20W/m <sup>2</sup>	2
Maintenance Room	—	20W/m <sup>2</sup>	2
Make-up Room	—	20W/m <sup>2</sup>	6
Conference Room	—	20W/m <sup>2</sup>	10
Director's Room	—	20W/m <sup>2</sup>	2
Staff Room	—	20W/m <sup>2</sup>	5

c) Outline of Ventilation System

The mechanical type ventilation system shall serve those rooms in which heat, dust, odors and moisture are generated. The ventilation system shall be the No. 3-type mechanical ventilation system. The names of rooms to which the mechanical ventilation system shall be applied and the number of times of ventilation are as follows:

<u>Names of Rooms</u>	<u>Number of Times of Ventilation/hour</u>
Scenery Area, Air-conditioning Machine Room, Pump Room	5
Electricity room	10
Toilets	15
Tea Kitchen	20
Corridor on the 2nd floor	2

(5) Building Materials Plan

1) Basic Policies

This facility is a TV studio building where the installation and carrying-in of equipment take place frequently. Therefore, in selecting the building materials for this facility, importance shall be attached to the functionality of the materials, and principles shall be adopted to select materials that are not stained easily, but strong and durable. Especially with regard to the interior finish of the studio and its related rooms, every care shall be taken to ensure that the materials to be used will all be those possessing sound-insulation and sound-absorption characteristics so that the TV studio to be constructed with these materials may be able to maintain the environment required of a TV studio. As to the interior finishing materials for other general workrooms, those that are suited to the climate of Laos, that are rational and can be easily maintained and managed, shall be selected. And as for the exterior finishing materials, they shall be those that are suited to the weather of Laos and fully reflect the nation's architectural style.

2) Exterior Finishing Materials

Roof : (General) Wooden framework upon concrete slabs +  
roof + concrete tile  
: (Partly) Cement tiles, laid over asphalt water-  
proofed concrete slabs  
Walls : Mortared bricks with lithing finish  
Floor : (Porch, platform) Concrete, steel trowelled finish  
Openings : Steel doors, aluminum windows

3) Interior Finishing Materials (for main rooms only)

a) Studio

Floor : Vinyl tiles  
Skirting : Hardwood, clear-lacquer painted  
Walls : Mortar + sound-absorption finish — A \*Note 1)  
Ceiling : Glass-wool + glass-cloth covered with crimped  
metal-glass net

- b) Sub-control Room, Announcer Booth, Studio Anteroom  
 Floor : Vinyl tiles  
 Skirting : Hardwood, clear-lacquer painted  
 Walls : Mortar + sound-absorption finish — B \*Note 2)  
 Ceiling : Mineral Acoustic Tiles
- c) Editing Rooms, Tape-copying Rooms, Dimmer Unit Room, Camera Store, Make-up Room, Waiting Area, Conference Room, Director's Office, Staff Room, Maintenance Room, Corridors, Staircase, etc.  
 Floor : Vinyl tiles  
 Skirting : Hardwood, clear-lacquer painted  
 Walls : Mortar + synthetic-resin emulsion paint (EP)  
 Ceiling : Mineral Acoustic Tiles
- d) Scenery Area  
 Floor : Mortar  
 Skirting : Hardwood, VP painted  
 Walls : Mortar + EP painted  
 Ceiling : Fair Faced Concrete
- e) Air-conditioning Machine Room  
 Floor : Mortar  
 Skirting : Mortar  
 Walls : Mortar + EP painted  
 (Mortar applied only to the studio-side wall +  
 sound-absorption finish — C \*Note 3)  
 Ceiling : Glass-wool + glass-cloth
- f) Entrance Hall  
 Floor : Marble  
 Skirting : Marble  
 Walls : Mortar + EP painted  
 Ceiling : Mineral Acoustic Tiles

g) Toilet

Floor : Ceramic mosaic tiles  
Walls : Ceramic wall tiles, 100 × 100  
Ceiling : Mineral Acoustic Tiles

\*Note 1) Sound-absorption finish — A :

Welded metal net over lightweight structural steel +  
glass-wool (thickness 50mm, density 50kg/m<sup>3</sup>) +  
glass-cloth + crimped metal net

\*Note 2) Sound-absorption finish — B :

Glass-wool (thickness 50mm, density 32kg/m<sup>3</sup>) over  
light-weight structural steel + polyethylene film +  
plywood (flat and perforated) EP painted

\*Note 3) Sound-absorption finish — A :

Glass-wool (thickness 50mm, density 24kg/m<sup>3</sup>)



### 4-3-3 Equipment Plan

#### (1) Transmitting Equipment

##### 1) Transmitter

The transmitter system has sufficient redundancy because it is provided with a standby exciter and with a power amplifier stage consisting of a plural number of power amplifier modules. If the exciter in use should become out of order, the standby exciter will be automatically replaced. Both of the visual and aural power amplifier stages comprise plural power amplifier modules connected in parallel, by which the rated power output is obtained. This configuration allows the transmitter to continue transmission with some reduced output, even though any of the modules should experience trouble.

In case of a module breakdown, the transmitter output power is easily recovered by changing the faulty module to a spare one.

As described in the examination of designing conditions in item 4-2-2, the output power of the transmitter has been decided at 5kW and the transmitting channel at channel 9 (visual frequency: 203.25MHz, aural frequency: 208.75MHz).

##### 2) Ancillary Equipment to the Transmitter

As ancillary equipment, the following items are planned:

A diplexer (a coaxial circuit) for combining visual and aural outputs of the transmitter, a U-shaped link panel for switching the transmitter output to the transmitting antenna or to a dummy load, one dummy load set which has the same impedance load as that of the transmitting antenna, and one power supply board and one anti-lightning transformer as a part of the power supply facilities.

The anti-lightning transformer (a kind of isolation transformer) protects the transmitter from getting damaged by any abnormal surge in voltage induced by lightning. This transformer plays an extremely important role for the protection of the transmitter in Laos where lightning often occurs.

### 3) Programme Input and Monitoring Equipment

The programme input and monitoring equipment is used for processing of video and audio signals which become the input signals to the transmitter, and is also used for monitoring signals flowing to each stage of the transmitter. It consists of such items of equipment as video distribution amplifiers, an audio limiting amplifier, a colour bar generator, video and audio demodulators, and various kinds of monitoring equipment.

The video signal of programmes sent through the studio-to-transmitter link from the studio centre is divided into two by means of the distribution amplifier and supplied to each of the two exciters (one in use, the other on standby) of the transmitter. The audio signal is also supplied to the exciters after its amplitude is limited to a rated value by the limiting amplifier in order to avoid over-modulation which will occur when too big a signal is fed to the exciter.

The colour bar generator is used for the adjustment of the transmitter as a signal source in the transmitter room. In order to watch the operational condition of the transmitter, signals picked up from main stages of the transmitter are monitored with a video, waveform and audio monitors through the demodulators.

### 4) Transmitting Antenna System

Four dipole antenna panels in four stacks are installed on the existing steel tower to two directions, the NE plane (51°) and NW plane (321°), and a two-dipole antenna panel in one stack to the SE plane (141°).

A main feeder with a diameter of 1-5/8 inches connects these antenna panels and the transmitter. The new antenna panels are installed without interruption of daily broadcasting services as described below.

- ① To begin with, half of the antenna panels are removed.
- ② A new main feeder and half of the new antenna panels are installed.
- ③ Transmission starts with the new transmitter and half of the new antenna panels.
- ④ The remaining half of the old antenna panels are removed.

- ⑤ Half of the new antenna panels are installed. (The installation of the new antenna system is completed.)
- ⑥ Overall adjustment of the new antenna system is conducted.

5) Studio-to-Transmitter Link (STL) and Radio Telephone

An STL on a 7GHz band is provided for transmission of broadcast programmes from the new studio centre to the transmitter. The microwave link has a standby function providing high reliability because failure of the link immediately causes interruption of broadcasting services.

The output power of the STL transmitter is one watt. A parabolic antenna with a 1.2m diameter is installed on a steel tower to be erected on the top of the studio building and the other parabolic antenna with the same size is installed on the existing tower in the transmitter site.

For communications between the studio and transmitter sites, one pair of 10W press-to-talk radio telephones on a 400MHz band is installed in the two places.

6) Transmitter Room

The transmitting equipment is installed in a room (vacant now) next to the existing transmitter room.

(2) Production Studio Equipment

Input sources of the video switcher of the production studio initially number nine as shown below but considering the use of an additional camera, VCRs and a digital picture effects in future, the video switcher input number has been decided at 12.

Camera	2	}	8
Video cassette tape recorder (VCR)	2		
Caption scanner	1		
Character generator	1		
Test signal	1		
Black burst	1	}	4
VCR	2		
Camera	1	}	(provision for future plan)
Digital picture effects	1		
Total			12

Input sources of the audio mixing console comprise:

Microphone	12	}	19
Tape recorder	2		
Audio cassette tape recorder	2		
VCR	2		
Test signal	1		
VCR	2	}	(provision for future plan)
Total			

As shown above, the total number of input sources becomes 21, but provision is made for selecting input sources for input channels of the console so that the input channel fader number is limited to 16. For watching video sources in the process of programme production, the following picture monitors are provided.

- 12-inch Monochrome picture monitor 8 sets
  - Camera 2 sets
  - VCR 2 sets
  - Character Generator 1 set
  - Caption Scanner 1 set
  - Preview (video switcher) 2 sets
- 20-inch Colour monitor 2 sets
  - Video switcher output 2 sets

(one each in control room and studio)

• 14-inch Colour monitor	2 sets
Master control output	1 set
Engineering monitor	1 set

Two VCR sets, mainly one for recording and the other for playback use, are installed.

A Laotian language character generator for superimposing Laotian on pictures is provided. The character generator comprises a Laotian word processor and an interface which converts the word processor output into a television signal.

The word processor is locally procured because a Laotian version word processor is not available in Japan.

Studio lighting equipment consists of a dimmer console, a dimmer unit rack, suspension mechanism, lanterns, etc. As a suspension mechanism, an I-beam rail system is applied. Lanterns hanging from I-beam rails can be moved on the rail.

The dimmer unit rack is installed in an independent room on the third floor so that the large current flowing through the dimmer rack does not interfere with delicate video and audio signals.

The dimmer units are remotely controlled from the dimmer console in the control room.

### (3) Master Control Room

The master control room facilities are largely divided into two, announcer booth production equipment and programme sending-out equipment.

#### 1) Announcer Booth Production Equipment

Basically, the announcer booth production system is made up of existing equipment.

Lighting equipment, cameras, a video switcher, etc., are transferred from the present production studio. The existing audio dubbing equipment is also moved in to this announcer booth for sound production.

#### 2) Programme Sending-out Equipment

The programme sending-out facilities comprise an audio-follow-video switcher; VCRs; sync. pulse generating equipment; master

clock system; video, pulse, audio distribution amplifiers and so forth.

The switcher input number is composed of 12 sources as listed below.

FPU	1
VCR	4
Production studio	1
Announcer booth	1
Test signal	1
Auxiliary	4
<hr/>	
Total	12

As video monitoring equipment, the following picture monitors common to the announcer booth system are provided in the master control room.

- 12-inch Monochrome picture monitor 8 sets
  - FPU 1 set
  - VCR 4 sets
  - Camera 2 sets
  - Preview 1 set
- 20-inch Colour monitor 2 sets
  - Announcer booth output 1 set
  - Master control output 1 set
- 20-inch TV receiver for on-the-air programme 1 set
- 14-inch Colour monitor for engineering monitor 1 set

Two VCR sets in half-inch tape format are newly installed and the 2 existing VCR sets in 3/4-inch tape format are transferred from the present studio centre.

In order to synchronize video signals throughout the studio centre, sync. pulse generating equipment with a standby unit is provided.

The sync. pulse generator in use has a colour bar generator unit which is used for a test signal in the station. Pulses, subcarrier and colour bars from the sync. pulse equipment are

distributed to cameras, video switchers, VCRs, etc., through pulse and video distribution amplifiers.

To obtain exact timing of programme sending-out, a master clock is installed, controlling a slave clock mounted on the wall in the master control room (MCR).

The microwave transmitter as a part of the programme link between the studio centre and transmitter site is also installed in the MCR.

(4) Editing Equipment

Editing equipment is used for removing unnecessary scenes on recorded tapes in accordance with the producer's intention and for rearranging recorded tapes.

(5) Tape-copy Equipment

The existing equipment continues to be used.

(6) OB Van

The existing OB van is used as it is.

(7) ENG Equipment

One set of ENG equipment comprising CCD camera combined with portable VCR, audio equipment and a portable lighting kit.

The audio equipment is composed of a super-directional microphone which picks up necessary sounds without outer noise mixed in, and mini-power wireless equipment by which the microphone output is sent to the VCR.

All the ENG equipment is battery operated, providing maximum mobility in news gathering on the spot.

(8) Measuring Equipment

Appropriate maintenance service is necessary to maintain the equipment in good condition. Measuring devices capable of checking the equipment conditions precisely are required for such maintenance service. Solid and reliable instruments that are easy to use such as an oscilloscope, a test signal generator, circuit testers, an audio test set, a frequency counter, a field intensity meter, etc., are provided in accordance with necessary maintenance items.

Furthermore, tool sets including screw drivers, cutting pliers, nippers, soldering irons, etc., are provided for maintenance work by maintenance technicians.

(9) Spare Parts

Details are to be defined at the time of the detailed design, but the following basic parts will be supplied as a minimum so that operation can be continued for about one year without replenishing parts after installation. During this period, the client can record the consumption rate of spare parts and take some budgetary actions.

Module or printed board of main equipment	1 set
Relay and switch	1 set
Lamp and fuse	1 set
Replaceable semi-conductor	1 set

(10) Installation Materials

Necessary amount of video cables, audio cables, control cables, multi-conductor cables, power cables, connectors, insulation tapes, etc., are required for the connection of equipment.



#### 4-3-4 Equipment List

As a result of the examination of the design policies and conditions, the compositions of the main equipment to be provided in each function room and its specifications are as follows.

##### (1) Transmitting Equipment

- |                           |       |   |
|---------------------------|-------|---|
| 1) 5kW VHF TV Transmitter | 1 set | CCIR System B, PAL<br>Visual output: 5kW<br>Aural output: 0.5kW<br>Channel: E-9<br>All solid state construction.<br>Video/audio separate, lower power stage modulation system.<br>Spare exciter built in. |
|---------------------------|-------|---|

##### 2) Ancillary Equipment

- |                               |   |  |
|-------------------------------|---|--|
| a) CIN Diplexer               | 1 | To combine visual output with aural output.                            |
| b) U-shaped Link Panel        | 1 | Diplexer output to be changed over from/to antenna to/from dummy load. |
| c) Dummy Load                 | 1 | For adjustment of transmitter  |
| d) Blower                     | 1 | To air-cool transmitter  |
| e) Power Supply Board         | 1 | Input voltage: 380V, 3 phases, 50Hz                                    |
| f) Anti-lightning Transformer | 1 | To protect transmitter against surge voltage induced by lightning.     |

##### 3) Programme Input and Monitoring Equipment

- |                                 |   |
|---------------------------------|---|
| a) Video Distribution Amplifier | 1 |
| b) Audio Limiting Amplifier     | 2 |

- |   |  |       |  |
|---|--|-------|--|
| c)  | Colour Bar Generator                               | 1     |  |
| d)  | Video/Audio Jack Panel                             | 1     |  |
| e)  | HF Jack Panel                                      | 1     |  |
| f)  | Visual Demodulator                                 | 1     |  |
| g)  | Aural Demodulator                                  | 1     |  |
| h)  | Monitor Switcher                                   | 1     |  |
| i)  | Picture Monitor                                    | 1     | 9-inch screen size                               |
| j)  | Waveform Monitor                                   | 1     |  |
| k)  | Audio Monitor                                      | 1     |  |
| l)  | Off-air Monitor                                    | 1     |  |
| m)  | Equipment Rack                                     | 1     |  |
| 4) Transmitting Antenna                                 |  |       |  |
| a)  | Antenna Panel                                      | 9     |  |
|   | • 4-dipole Antenna Panel,                          |       | NE, NW directions:                               |
|   | 8 panels   |       | 4 panels each                                    |
|   | • 2-dipole Antenna Panel,                          |       | SE direction: one panel                          |
|   | one panel  |       |  |
| b)  | Main Feeder  | 110m  | 1-5/8 inches in diameter.                        |
| c)  | Branch Feeder                                      | 1 set |  |
| d)  | Junction Box                                       | 1 set |  |
| e)  | Fixing Hardware and Accessories                    | 1 set |  |
| f)  | Dehydrator   | 1     |  |
| 5) Studio-to-Transmitter Link (STL) and Radio Telephone |  |       |  |
| a)  | Equipment to be installed in Transmitting Building |       |  |
| ①   | STL Receiver with Standby                          | 1 set | 7GHz band  |
| ②   | Parabolic Antenna and Waveguide                    | 1 set | 1.2m in diameter<br>Elliptical waveguide         |
| ③   | Radio Telephone                                    | 1 set | 400MHz band, 10W<br>Press-to-talk communications |
| ④   | Directional Antenna and Feeder for above           | 1 set |  |

b) Equipment to be installed in  
New Studio Building

①	STL Transmitter with Standby	1 set	7GHz band, 1W
②	Parabolic Antenna and Waveguide	1 set	1.2m in diameter Elliptical waveguide
③	Radio Telephone	1 set	400MHz band, 10W Press-to-talk communications
④	Omnidirectional Antenna and Feeder for above	1 set	

(2) Production Studio Equipment

1)	Colour Camera	(2 sets)	
a)	Camera Head	2	CCD, triaxial cable, with 5-inch viewfinder
b)	Zoom Lens	2	13 times, full servo
c)	Pan-and-tilt Head	2	
d)	Tripod and Dolly	2	Tripod combined dolly
e)	Camera Cable (25m)	2	Triaxial cable with connectors at both ends
f)	Camera Control Unit	2	
g)	Test Chart	2	Gray scale, resolution, hue
h)	Test Chart Stand	1	With light
i)	Script Holder	2	
j)	Rack	1	

2) Video Equipment

a)	Video Switcher	(1 set)	
①	Main Matrix	1	12 inputs
②	Mix Keyer	2	
③	Downstream Keyer	1	
④	BB/BC Generator	1	
⑤	Wipe Pattern Generator	1	More than 30 patterns
⑥	Soft Chromakey Generator	1	
⑦	Title Key Generator	1	
⑧	Tally Logic Panel	1	

⑨ Control Panel	1	
b) Video Distribution Amplifier	1 set	More than 4 outputs per unit. Necessary amount of amplifiers for making up system to be included.
c) Video Jack Panel with Patching Cord	1 set	More than 20 inputs
d) Rack Assembly	1	
e) Switcher/PD Console	1	About 1,200mm wide
f) VE Console	1	About 600mm wide
g) Pulse Distribution Amplifier	1 set	More than 4 outputs per unit. Necessary amount of amplifiers for making up system to be included.
h) Operator Chair	7	
i) Camera and Microphone Connector Panel	1 set	
j) On-the-Air Indicator	3	
3) Video Tape Recorder		
a) Video Tape Recorder	2	1/2-inch cassette tape Maximum recording time: 90 minutes
b) Colour Monitor	1	14-inch screen size
c) Audio Monitor	2	
d) Rack	2	
4) Character Generator		
a) Laotian Word Processor	1	
b) Interface Device	1	
5) Caption Scanner	1	

- 6) Audio Equipment
- a) Audio Mixing Console 1 16 inputs, monaural
  - b) Audio Tape Recorder 2 Open reel, 6mm tape  
19 or 9.5mm/s selectable
  - c) Audio Cassette Tape Recorder 2
  - d) Microphones
    - ① Uni-directional Condenser Mic 3
    - ② Omni-directional Condenser Mic 3 Lavalier
    - ③ Uni-directional Dynamic Mic 4
    - ④ Omni-directional Dynamic Mic 4
  - e) Microphone Stand
    - ① Desk Stand 5
    - ② Floor Stand 5 About 1,500~2,000mm high
    - ③ Floor Stand 5 About 800~1,500mm high
    - ④ Boom Stand (Small) 1
  - f) Microphone Cord
    - ① Cord (20m long) 10
    - ② Cord (10m long) 5
  - g) Audio Jack Panel with Patching Cord 1 set More than 20 inputs
  - h) Audio Distribution Amplifier 1 set More than 8 outputs per unit.  
Necessary amount of amplifiers for making up system to be included.
  - i) Rack Assembly 1 set
- 7) Monitoring Equipment
- a) For Production
    - ① Monochrome Picture Monitor 8 12-inch screen size
    - ② Colour Picture Monitor 1 20-inch screen size
    - ③ Colour Picture Monitor 1 14-inch screen size

④	Monitor Rack	1	
b)	For Engineering Monitor		
①	Waveform Monitor	1	
②	Vector Scope	1	
③	High-Resolution Colour Picture Monitor	1	14-inch screen size
c)	For Studio Floor		
①	Colour Picture Monitor	1	20-inch screen size
②	Speaker	1	
③	Power Amplifier	1	300W + 300W
④	Cart	1	
⑤	Wall-mounted Speaker	1	
⑥	Power Amplifier	1	100W + 100W
d)	Speaker in Control Room		
①	Speaker	2	
②	Power Amplifier	1	300W + 300W
③	Cart	2	
8)	Studio Intercom		
a)	Matrix	1	With power supply
b)	Switch Panel	1	
c)	Jack Panel	8	
d)	Head Set	14	
9)	Studio Lighting Equipment		
a)	Suspension Devices	1 set	I-beam rail with no motorized barrel
b)	Lighting Control Equipment	1 set	
c)	Cyclorama Curtain	1 set	
d)	Lantern and Accessory	1 set	
(3)	Master Control Room		
1)	Video Equipment		
a)	Programme Sending-out Switcher	1	12 inputs
b)	Video Distribution Amplifier	1 set	
c)	Video Equalizing Amplifier	1 set	
d)	Video Jack Panel with Patching Cord	1 set	

- e) Rack Assembly 1
  - f) Operator Chair 2
- 2) Sync. Pulse Generating Equipment
- a) Sync. Pulse Generator 2
  - b) Colour Bar Unit 1
  - c) Changeover Switch 1
  - d) Pulse Distribution Amplifier 1 set
- 3) Video Tape Recorder
- a) Video Tape Recorder 2
  - b) Colour Monitor 1 14-inch screen size
  - c) Audio Monitor 2
  - d) Rack 2
- 4) Audio Equipment
- a) Programme Sending-out Switcher 1
  - b) Audio Jack Panel with Patching Cord 1 set
  - c) Audio Distribution Amplifier 1 set
  - d) Limiting Amplifier 1
  - e) Rack Assembly 1 set
- 5) Monitoring Equipment
- a) Monochrome Picture Monitor 8 12-inch screen size
  - b) Colour Picture Monitor 2 20-inch screen size
  - c) High-resolution Colour Picture Monitor 1 14-inch screen size
  - d) Waveform Monitor 1
  - e) Vectorscope 1
  - f) Off-air Monitor 1 20-inch screen size
  - g) Monitor Rack 1
  - h) Speaker 1
  - i) Power Amplifier 1
  - j) Cart 1
- 6) Room-to-Room Interphone
- a) Interphone Unit 5

b)	Power Supply	1	
7)	Clock Equipment		
a)	Master Clock Device	1	
b)	Slave Clock	1	
c)	Battery-operated Clock	5	
(4)	ENG Equipment		
1)	VTR Combined Portable Camera		
a)	Portable Camera	1	CCD used
b)	Video Tape Recorder	1	1/2-inch tape
c)	Motorized Zoom Lens	1	13-times
d)	Tripod with Dolly	1	
e)	Rechargeable Battery Pack	5	
f)	Battery Charger	1	
g)	AC/DC Adaptor	1	
h)	VTR Playback Adaptor	1	
i)	Carrying Case	1	
2)	Audio Equipment		
a)	Condenser Microphone	1	Super uni-directional
b)	UHF Transmitter	1	900MHz band
c)	UHF Portable Tuner	1	
d)	Portable Lighting Kit	1	set
(5)	Measuring Equipment		
1)	Oscilloscope with Cart	1	100MHz bandwidth, 3 inputs
2)	TV Test Signal Generator	1	Multiburst, Pulse/bars, stair-step, window, color bars
3)	Digital Multi-meter	4	DC voltage:0.3~1,000V DC current:0.12~1,200A AC voltage:3~300V Resistance:2K~200M ohms
4)	Audio Distortion Meter/Oscillator	1	Frequency response, distortion, S/N



5) Digital Frequency Counter	1	Frequency range:0.1MHz to 1GHz
6) Field Intensity Meter	1	VHF band
7) AM Sideband Analyzer	1	One designated Channel in VHF
8) Illumination Photometer	1	
9) Colour Meter	1	
10) Meger	1	
11) Hand Tool Set	2 sets	With case
(6) Spare parts	1 set	For one year of operation
(7) Installation Materials	1 set	

#### 4-3-5 Basic Design Drawings

- (1) Fig. A-1 WHOLE SITE MAP, SCALE 1/2,000
- (2) Fig. A-2 SITE LAYOUT PLAN, SCALE 1/500
- (3) Fig. A-3 GROUND FLOOR PLAN, SCALE 1/200
- (4) Fig. A-4 FIRST FLOOR PLAN, SCALE 1/200
- (5) Fig. A-5 SECOND FLOOR PLAN, SCALE 1/200
- (6) Fig. A-6 ROOF PLAN, SCALE 1/200
- (7) Fig. A-7 SOUTH ELEVATION, SCALE 1/200
- (8) Fig. A-8 EAST ELEVATION, SCALE 1/200
- (9) Fig. A-9 NORTH ELEVATION, SCALE 1/200
- (10) Fig. A-10 WEST ELEVATION, SCALE 1/200
- (11) Fig. A-11 SECTION-1, SCALE 1/200
- (12) Fig. A-12 SECTION-2, SCALE 1/200
- (13) Fig. A-13 SEQUENCE DIAGRAM OF ELECTRICAL INSTALLATION
- (14) Fig. A-14 SCHEMATIC DIAGRAM OF AIR-CONDITIONING SYSTEM
- (15) Fig. TX-1 SCHEMATIC DIAGRAM OF TRANSMITTING STATION
- (16) Fig. TX-2 SCHEMATIC DIAGRAM OF 5kW TV TRANSMITTER
- (17) Fig. TX-3 SCHEMATIC DIAGRAM OF ANTENNA SYSTEM
- (18) Fig. TX-4 HORIZONTAL DIRECTIVITY OF ANTENNA
- (19) Fig. TX-5 ANTICIPATED SERVICE AREA
- (20) Fig. TX-6 EQUIPMENT LAYOUT OF TRANSMITTING ROOM
- (21) Fig. ST-1 SCHEMATIC DIAGRAM OF STUDIO VIDEO SYSTEM
- (22) Fig. ST-2 SCHEMATIC DIAGRAM OF STUDIO AUDIO SYSTEM
- (23) Fig. ST-3 SCHEMATIC DIAGRAM OF STUDIO INTERCOM AND INTERPHONE SYSTEMS
- (24) Fig. ST-4 SCHEMATIC DIAGRAM OF EDITING SYSTEM
- (25) Fig. ST-5 EQUIPMENT LAYOUT OF STUDIO CONTROL ROOM
- (26) Fig. ST-6 EQUIPMENT LAYOUT OF MASTER CONTROL ROOM
- (27) Fig. ST-7 STUDIO LIGHTING LAYOUT
- (28) Fig. ST-8 EQUIPMENT LAYOUT OF EDITING ROOM
- (29) Fig. ST-9 SCHEMATIC DIAGRAM OF ENG EQUIPMENT



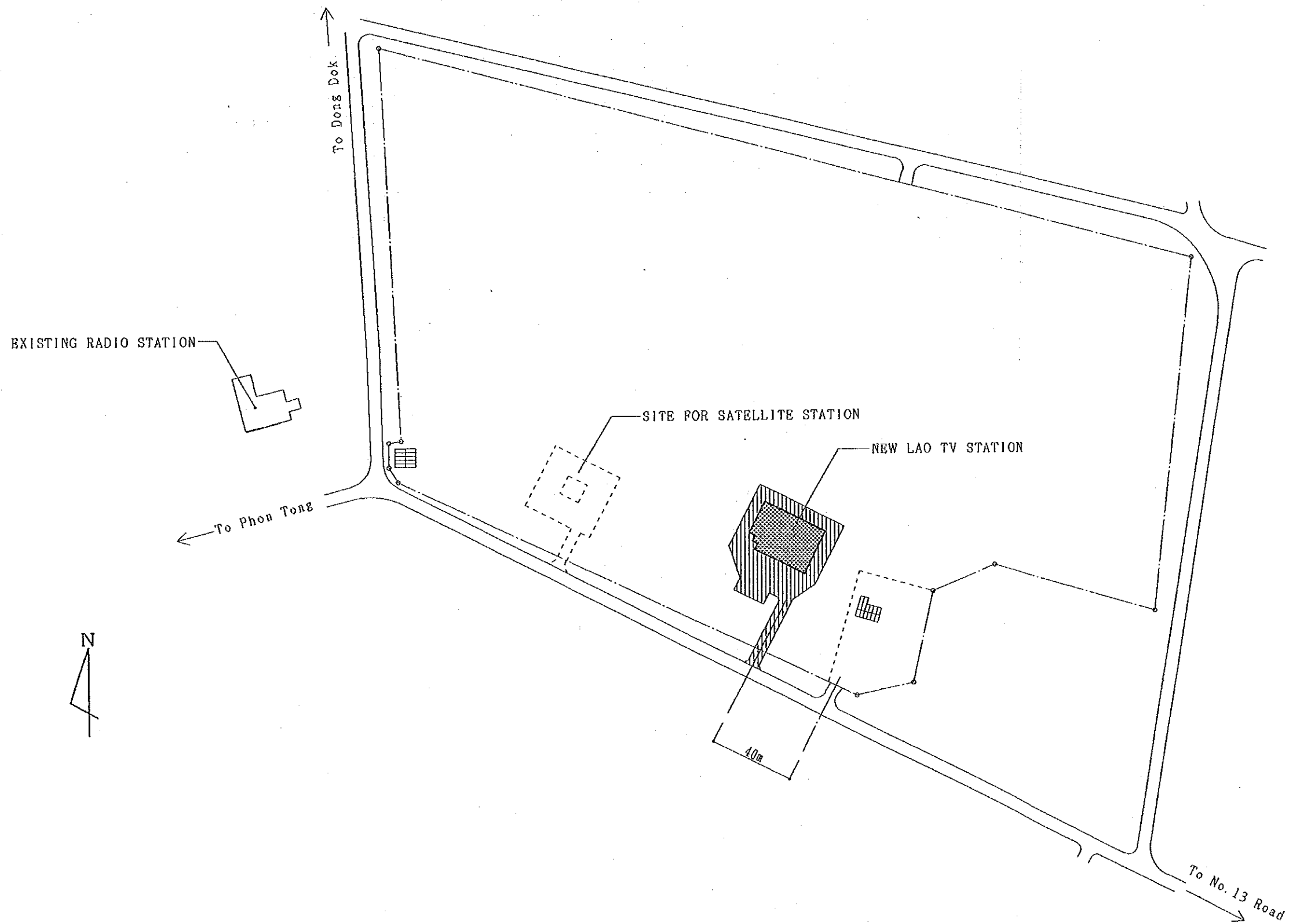


FIG. A-1 WHOLE SITE MAP, SCALE 1:2000

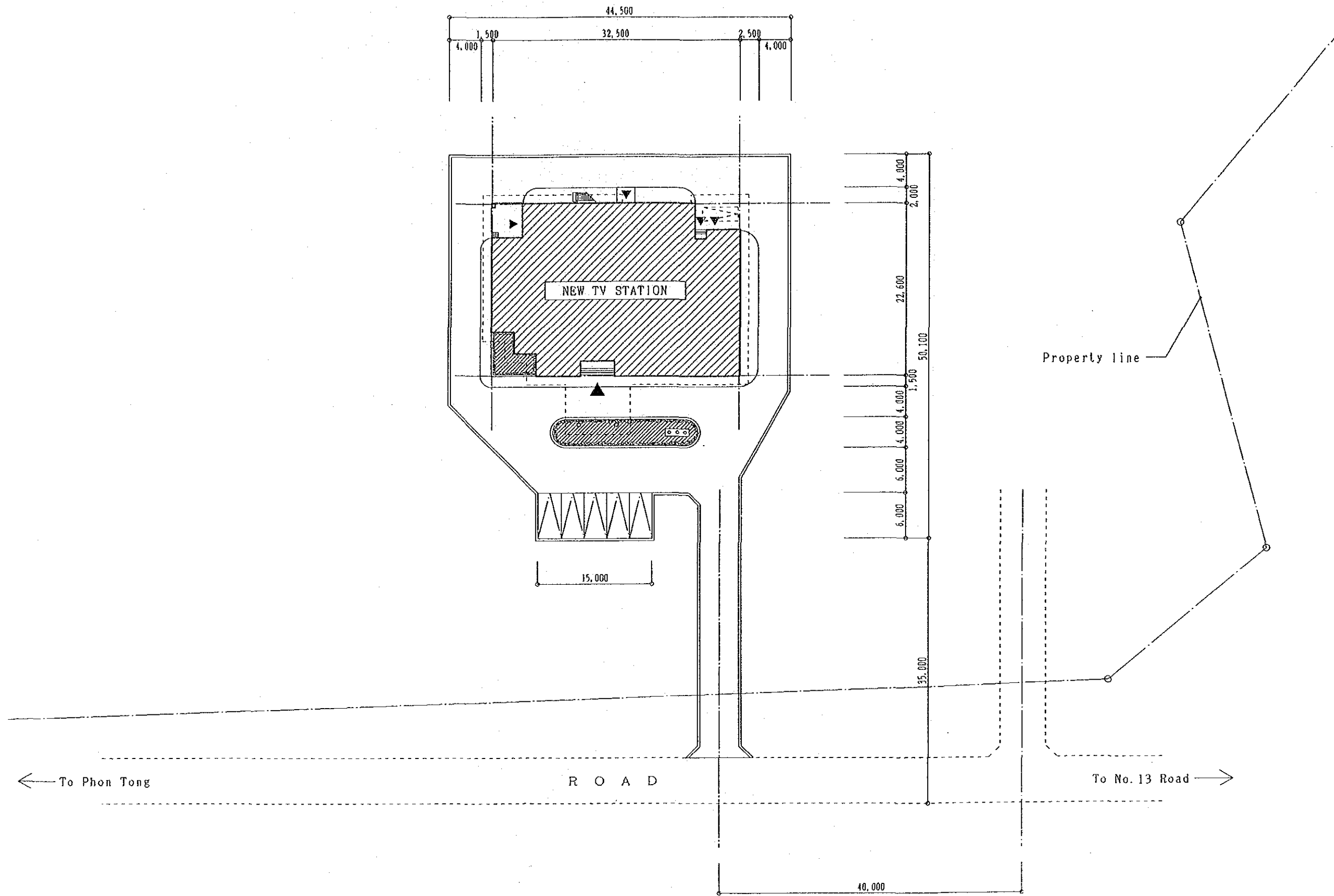


FIG. A-2 SITE LAYOUT PLAN, SCALE 1:500

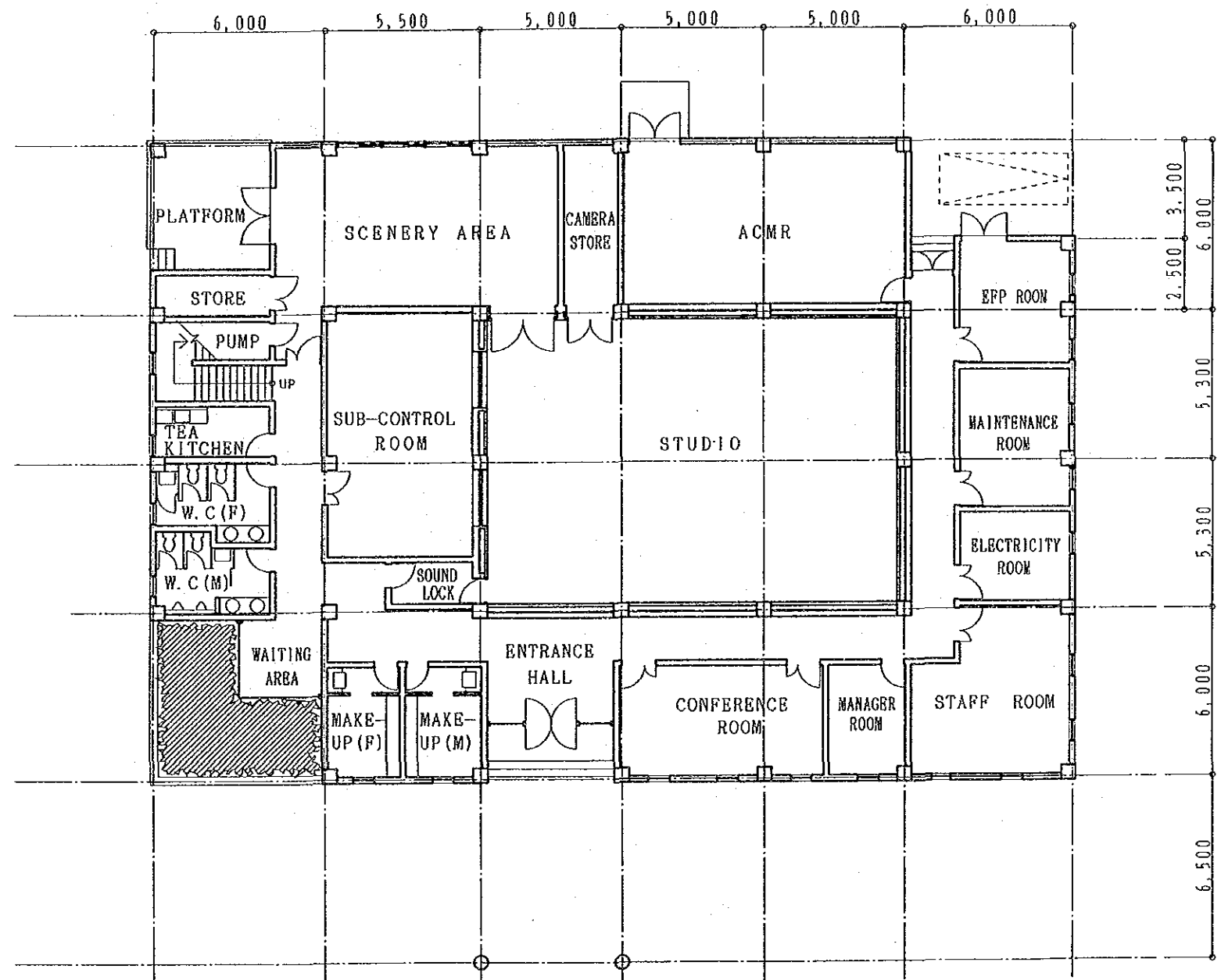


FIG. A-3 GROUND FLOOR PLAN, SCALE 1:200

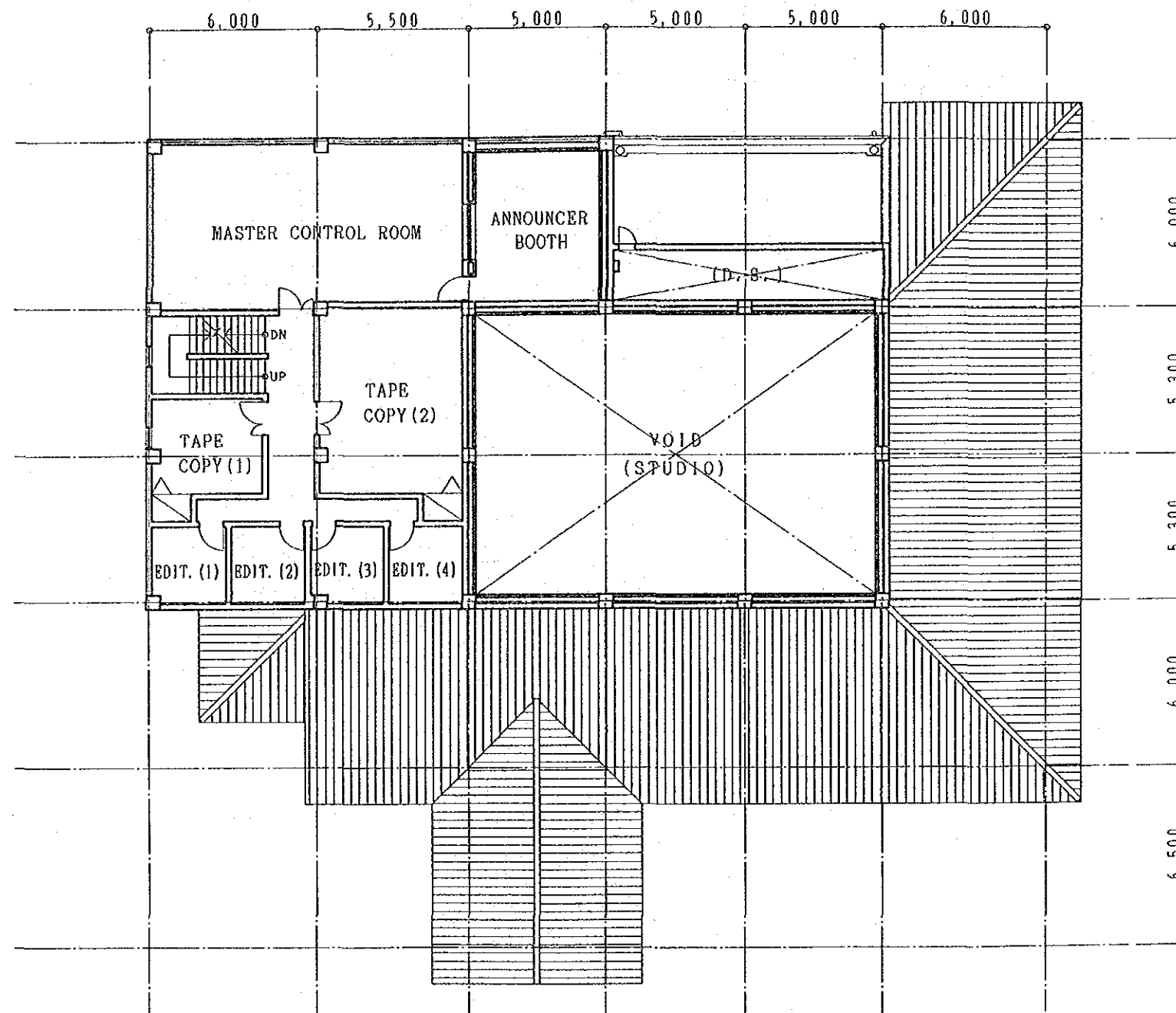


FIG. A-4 FIRST FLOOR PLAN, SCALE 1:200

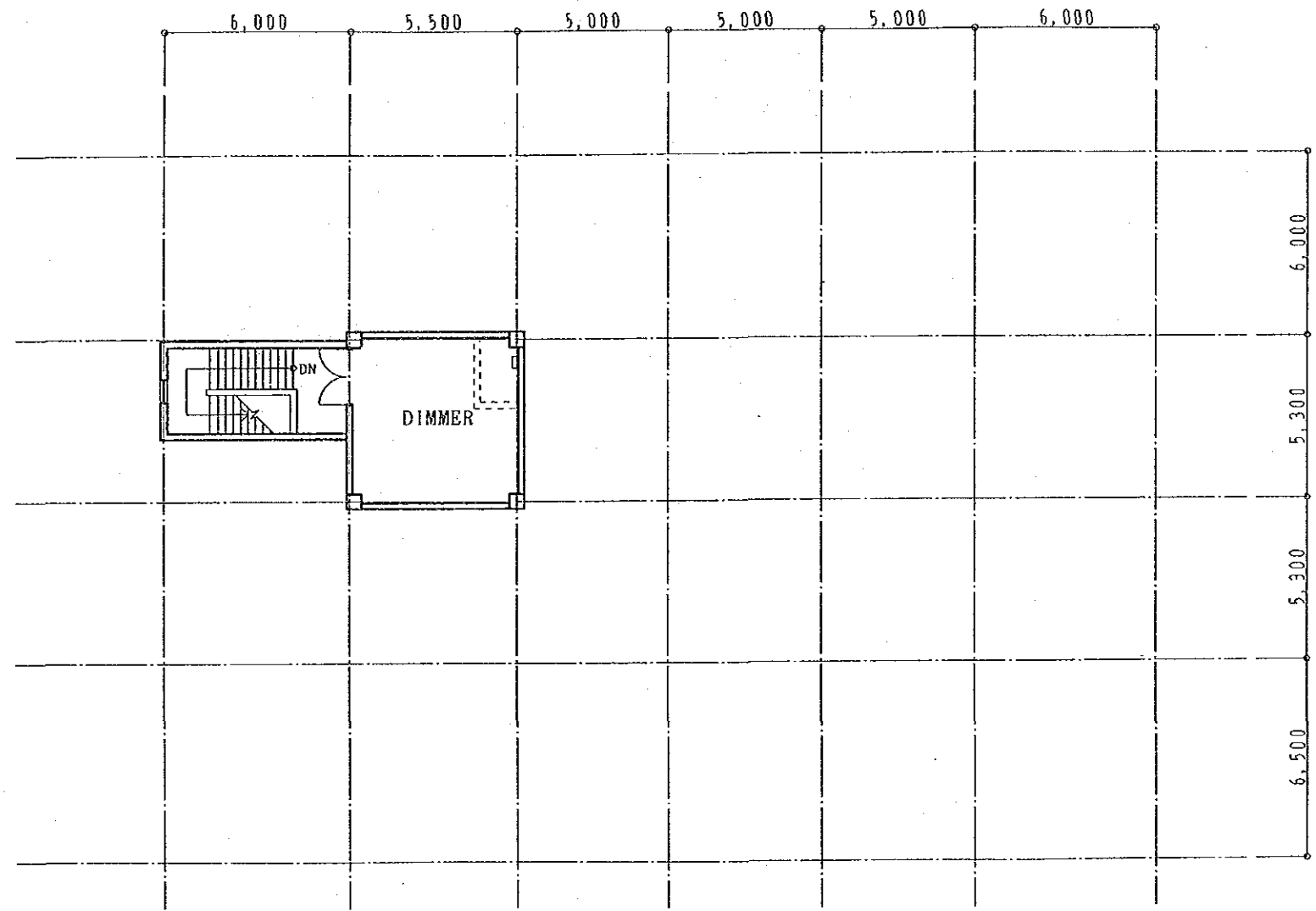


FIG. A-5 SECOND FLOOR PLAN, SCALE 1:200



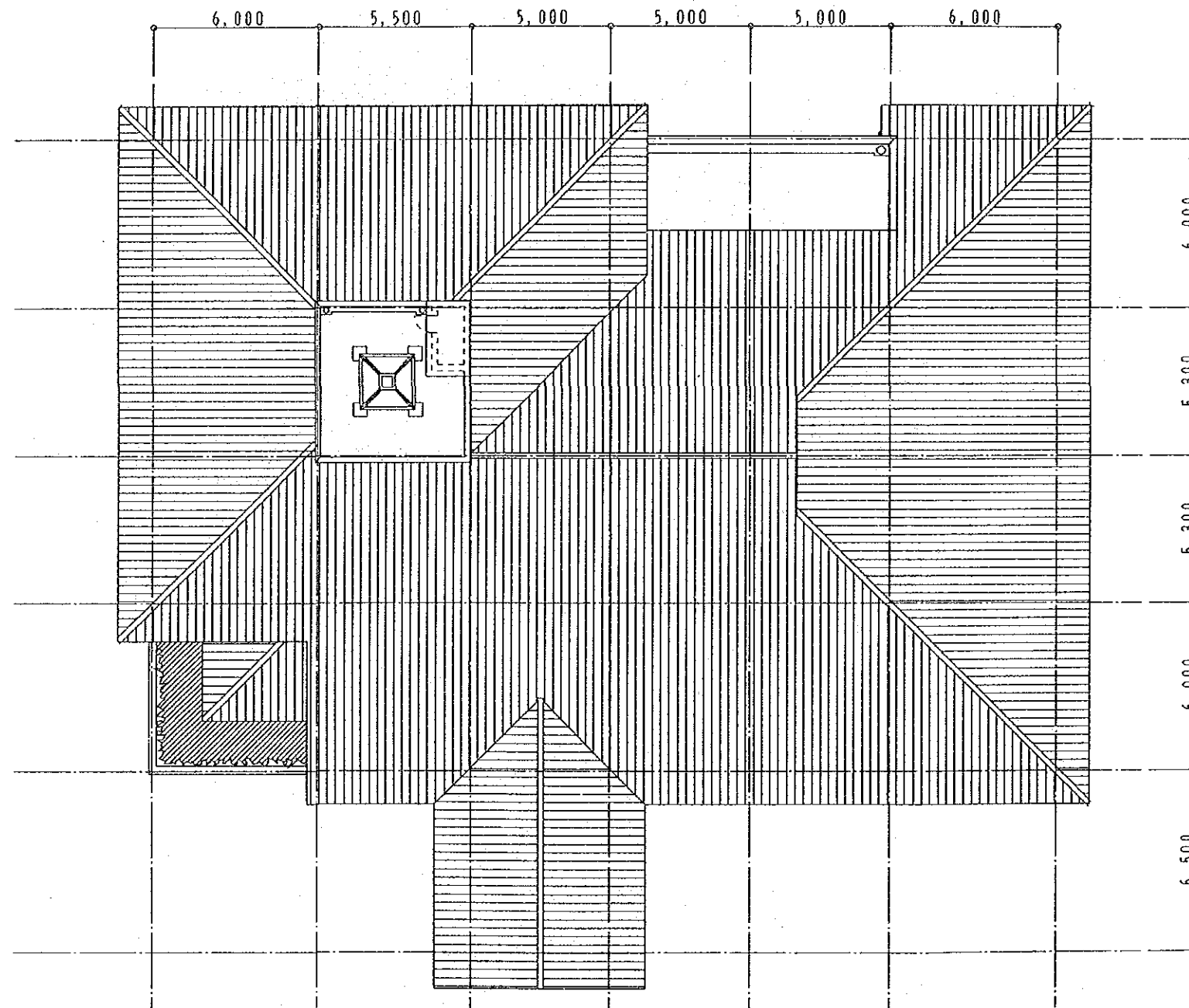


FIG.A-6 ROOF PLAN, SCALE 1:200

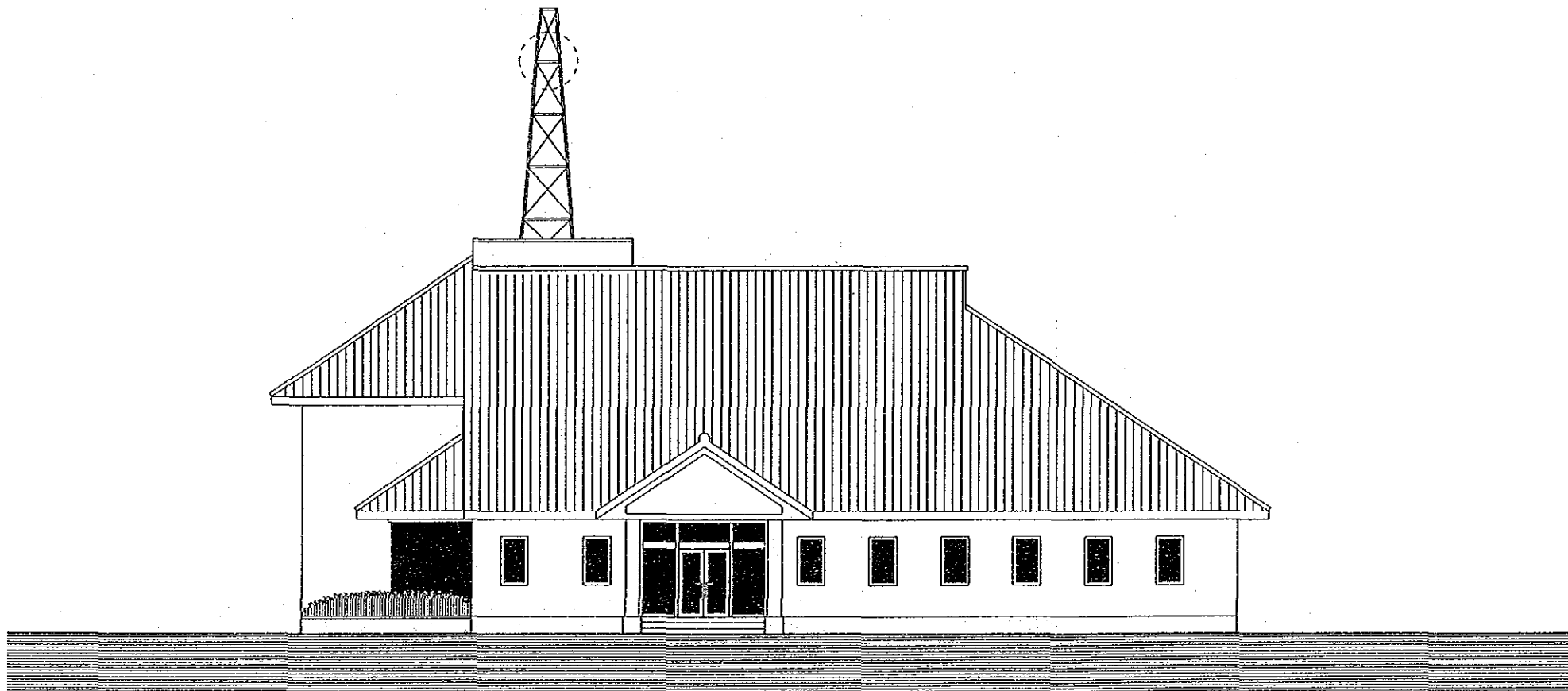


FIG. A-7 SOUTH ELEVATION, SCALE 1:200

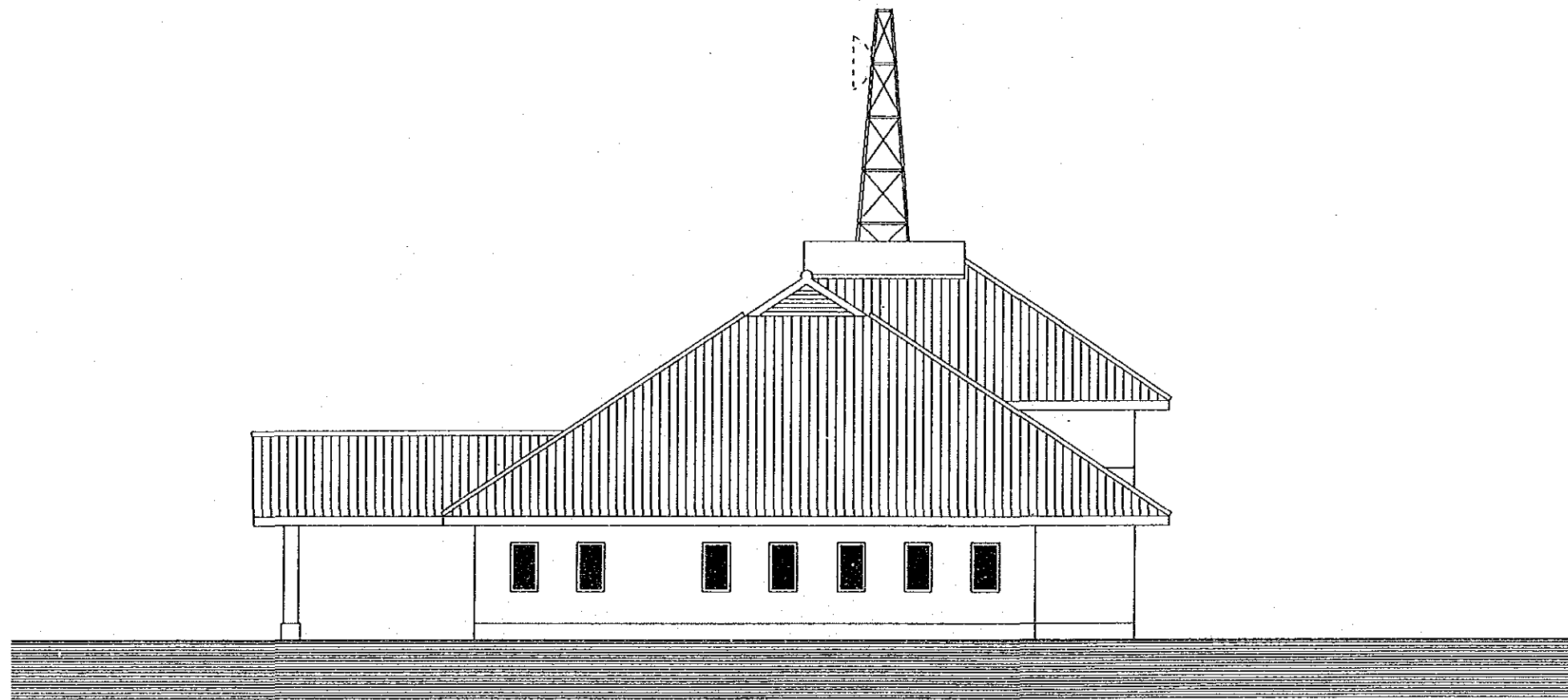


FIG.A-8 EAST ELEVATION, SCALE 1:200

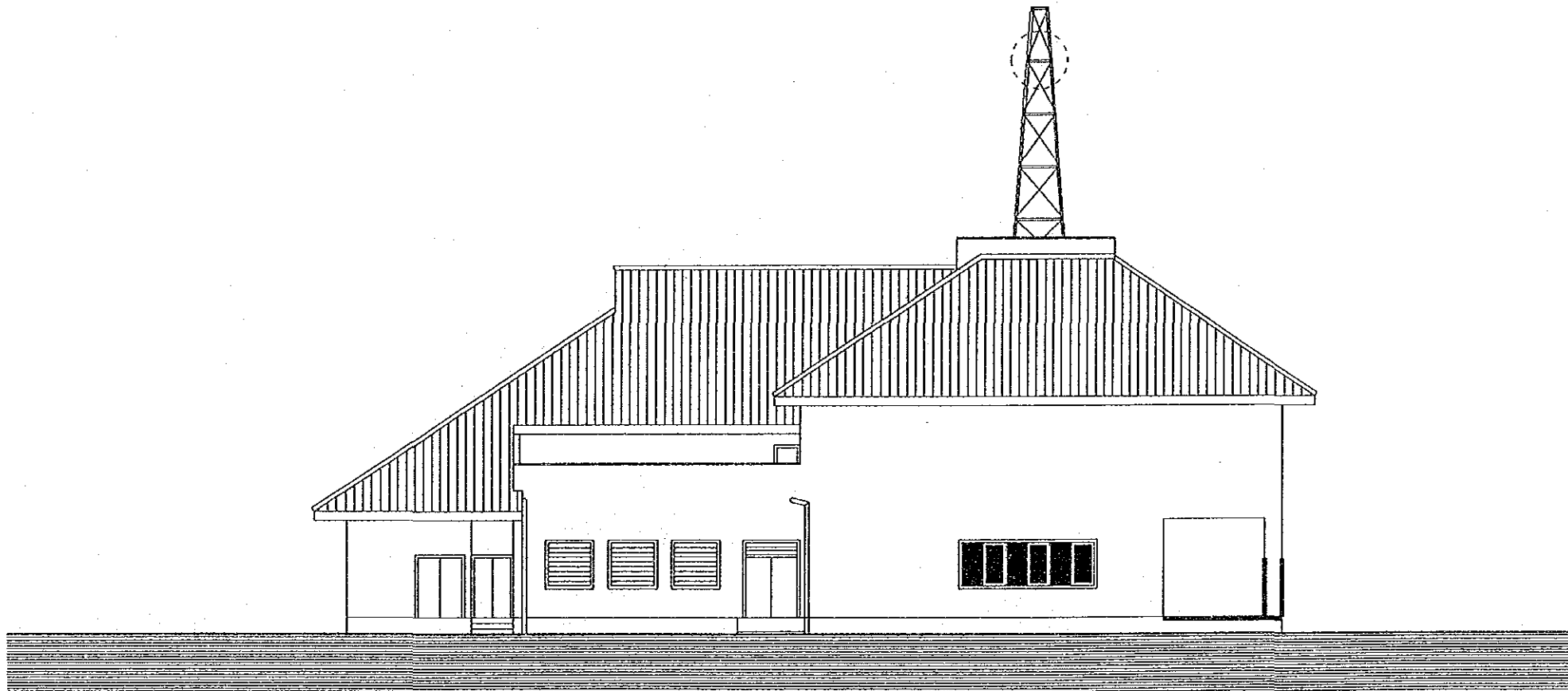


FIG. A - 9 NORTH ELEVATION, SCALE 1:200

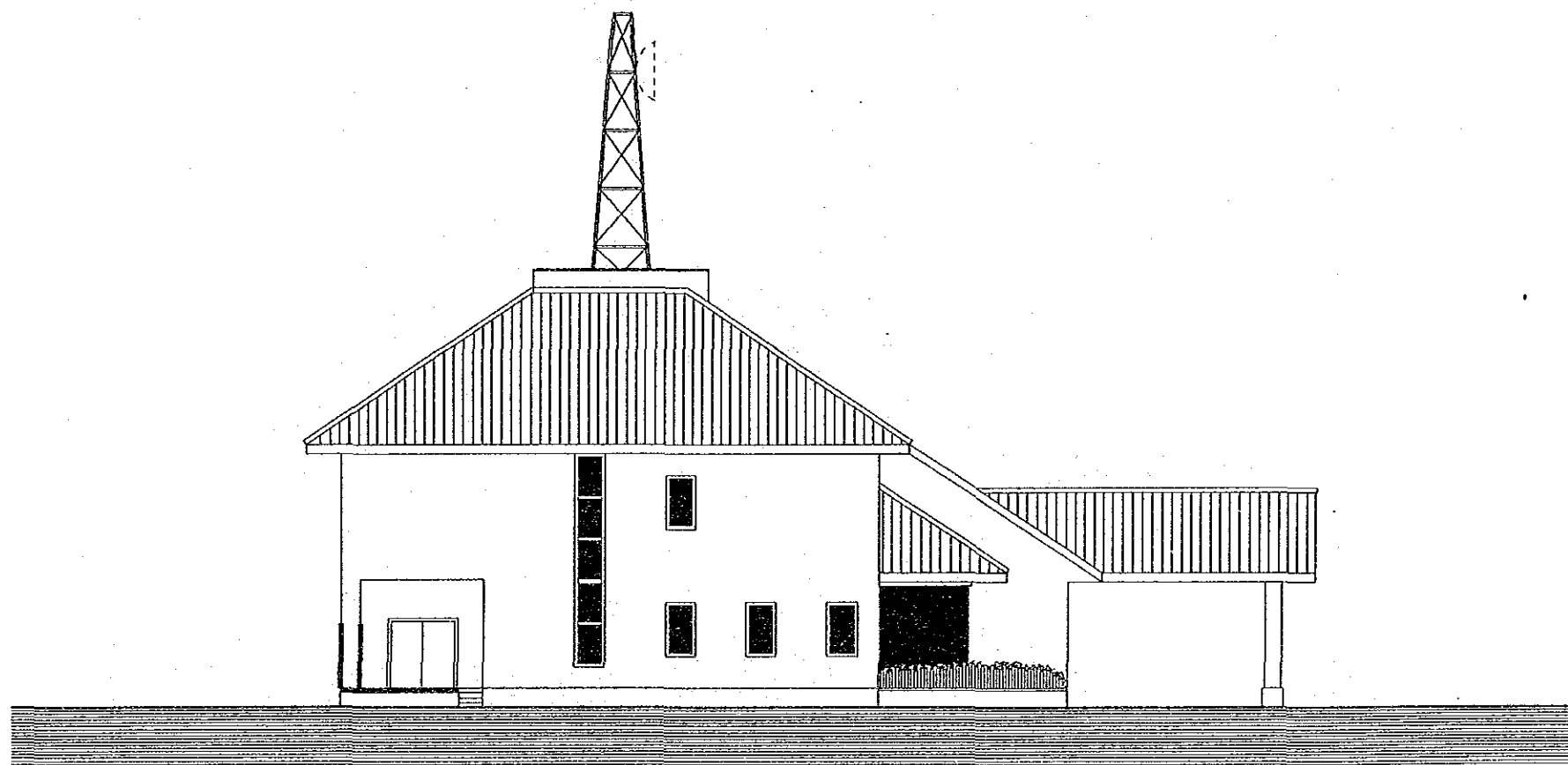


FIG. A-10 WEST ELEVATION, SCALE 1:200

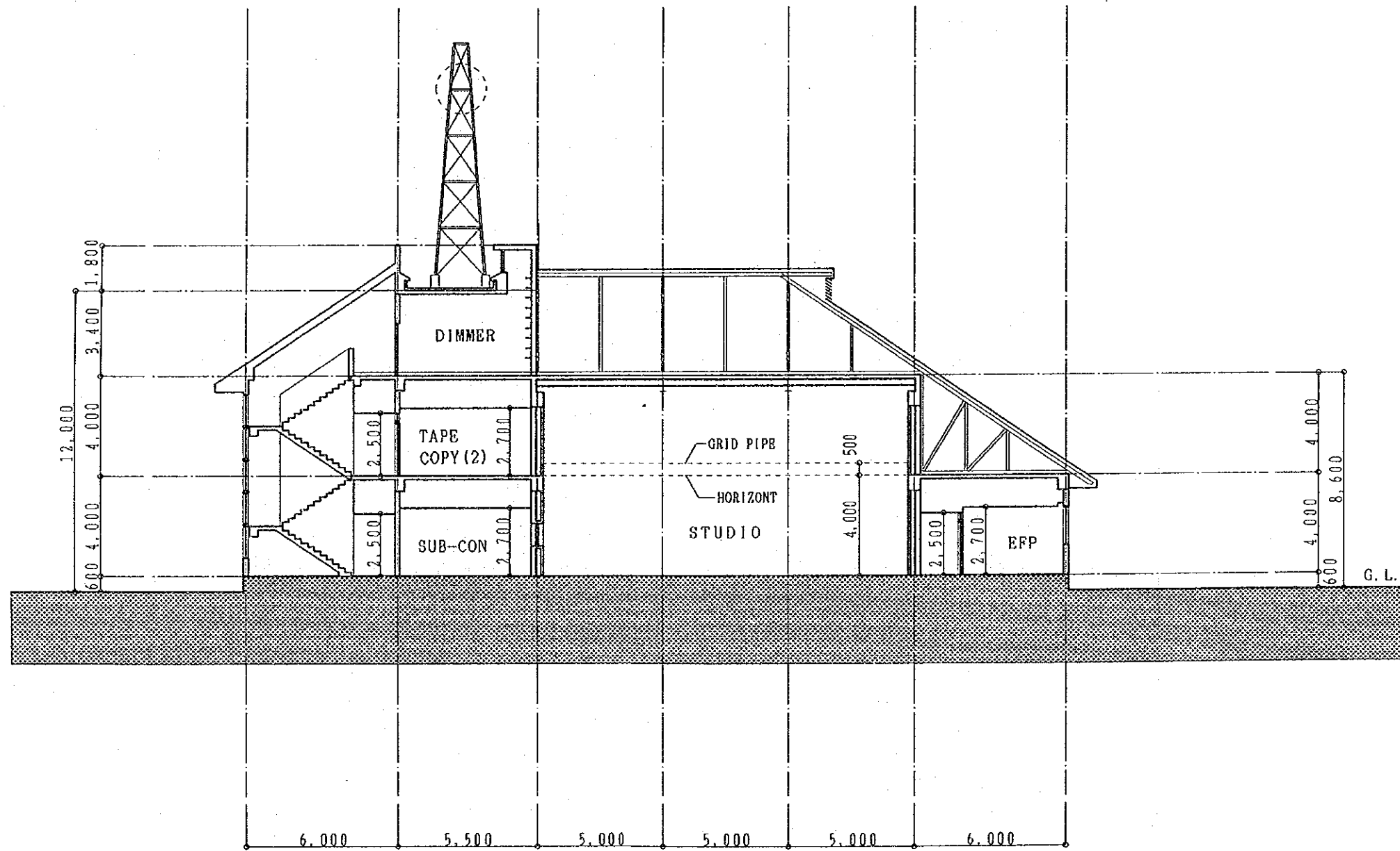


FIG. A-II SECTION -1, SCALE 1:200

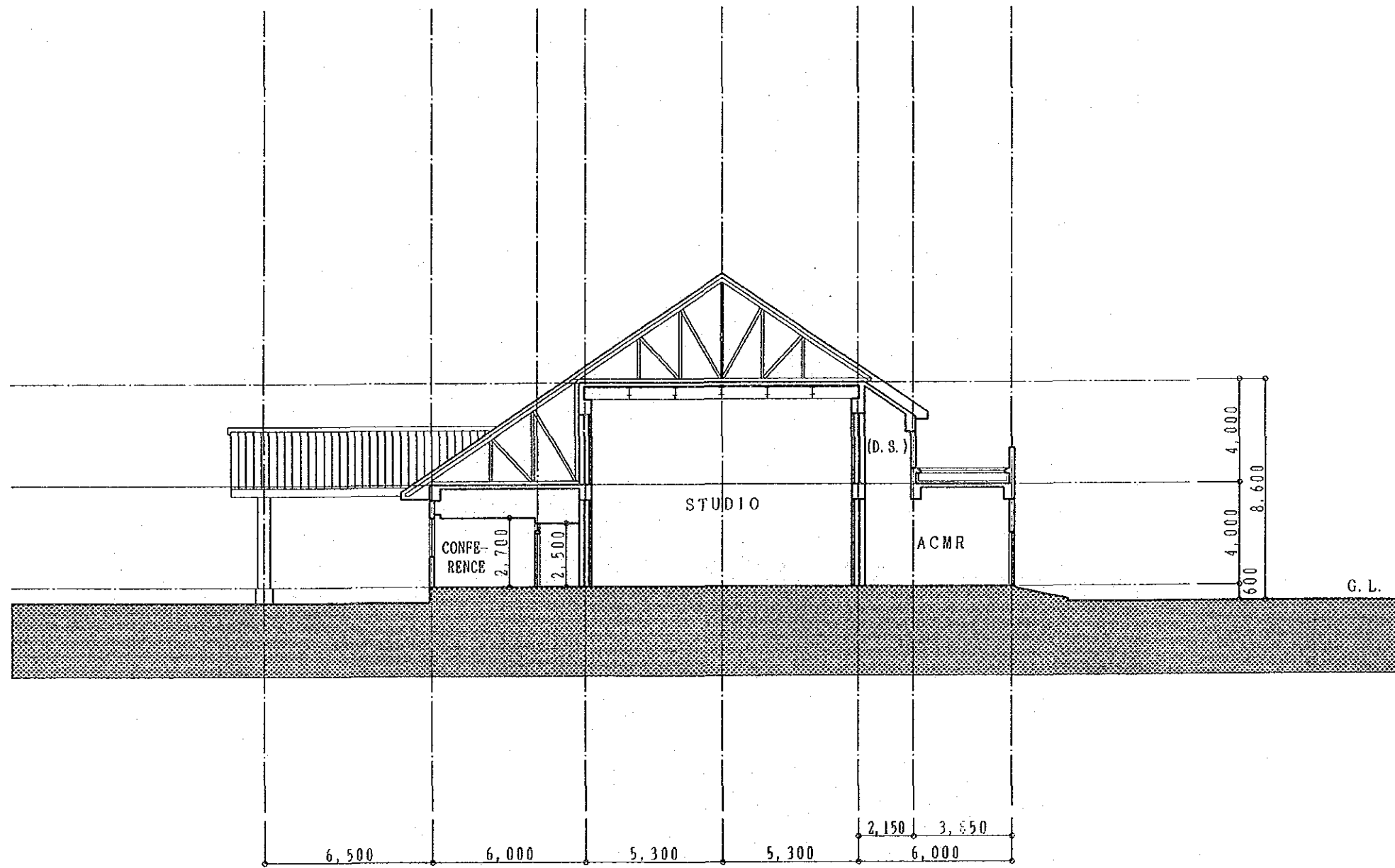
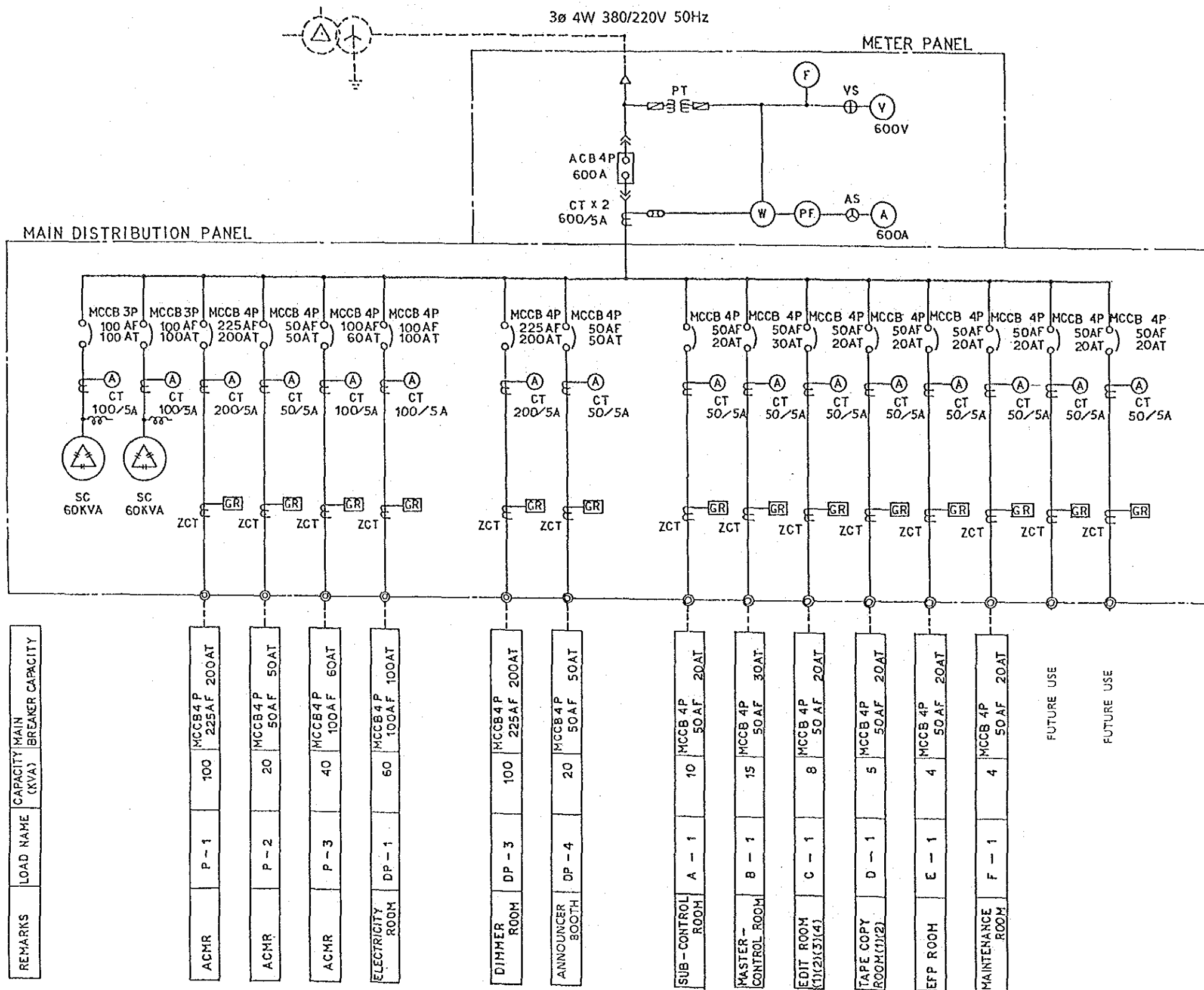


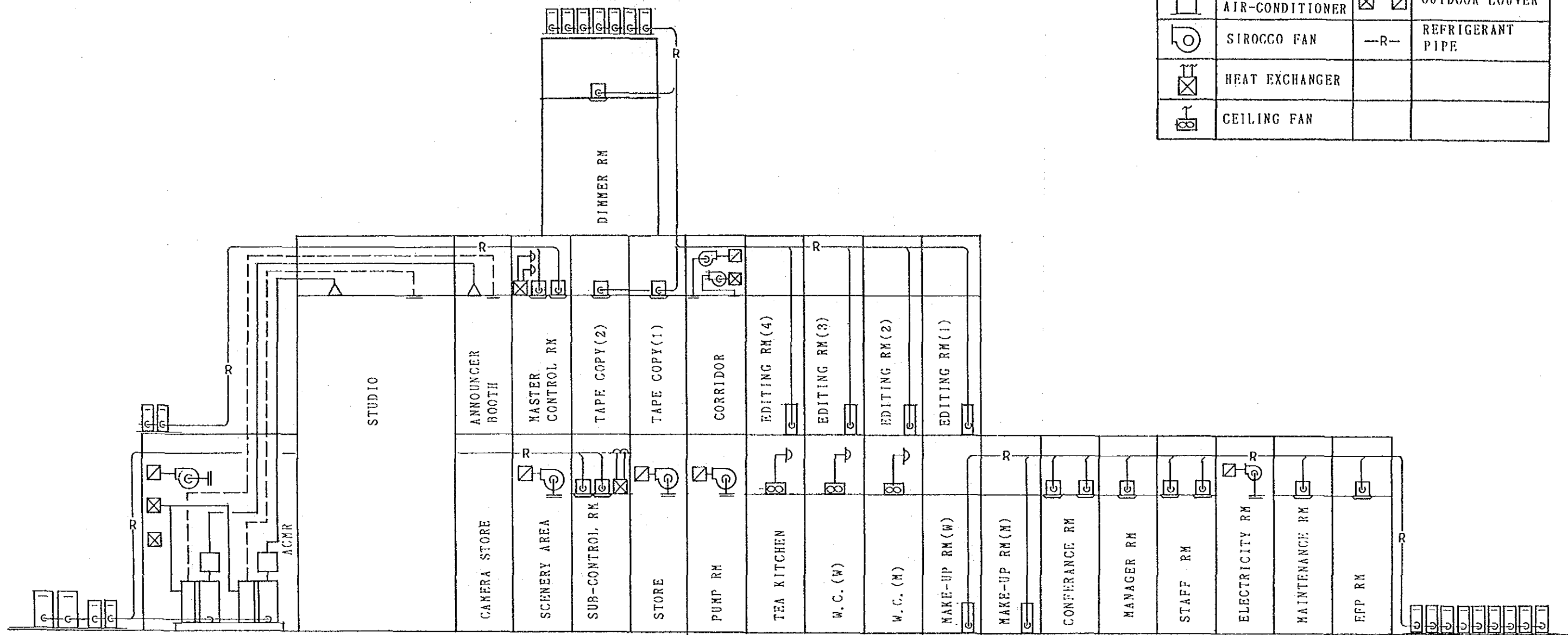
FIG. A - 12 SECTION - 2, SCALE 1:200



T E R M S	
A	AMMETER
AS	AMMETER SWITCH
CT	CURRENT TRANSFORMER
F	FREQUENCY METER
GR	GROUND RELAY
MCCB	MOLDED CASE CIRCUIT BREAKER
PF	POWER FACTOR METER
PT	POTENTIAL TRANSFORMER
V	VOLTMETER
VS	VOLTMETER SWITCH
W	WATTMETER
ZCT	0-PHASE CURRENT TRANSFORMER
SC	STATIC CONDENSER

FIG. A-13 SEQUENCE DIAGRAM OF ELECTRICAL INSTALLATION





	PACKAGED TYPE AIR-CONDITIONER		OUTLET
	BUILT-IN TYPE AIR-CONDITIONER		INLET
	FLOOR MOUNTED TYPE AIR-CONDITIONER		OUTDOOR LOUVER
	SIROGCO FAN		REFRIGERANT PIPE
	HEAT EXCHANGER		
	CEILING FAN		

FIG. A-14 SCHEMATIC DIAGRAM OF AIR-CONDITIONING SYSTEM



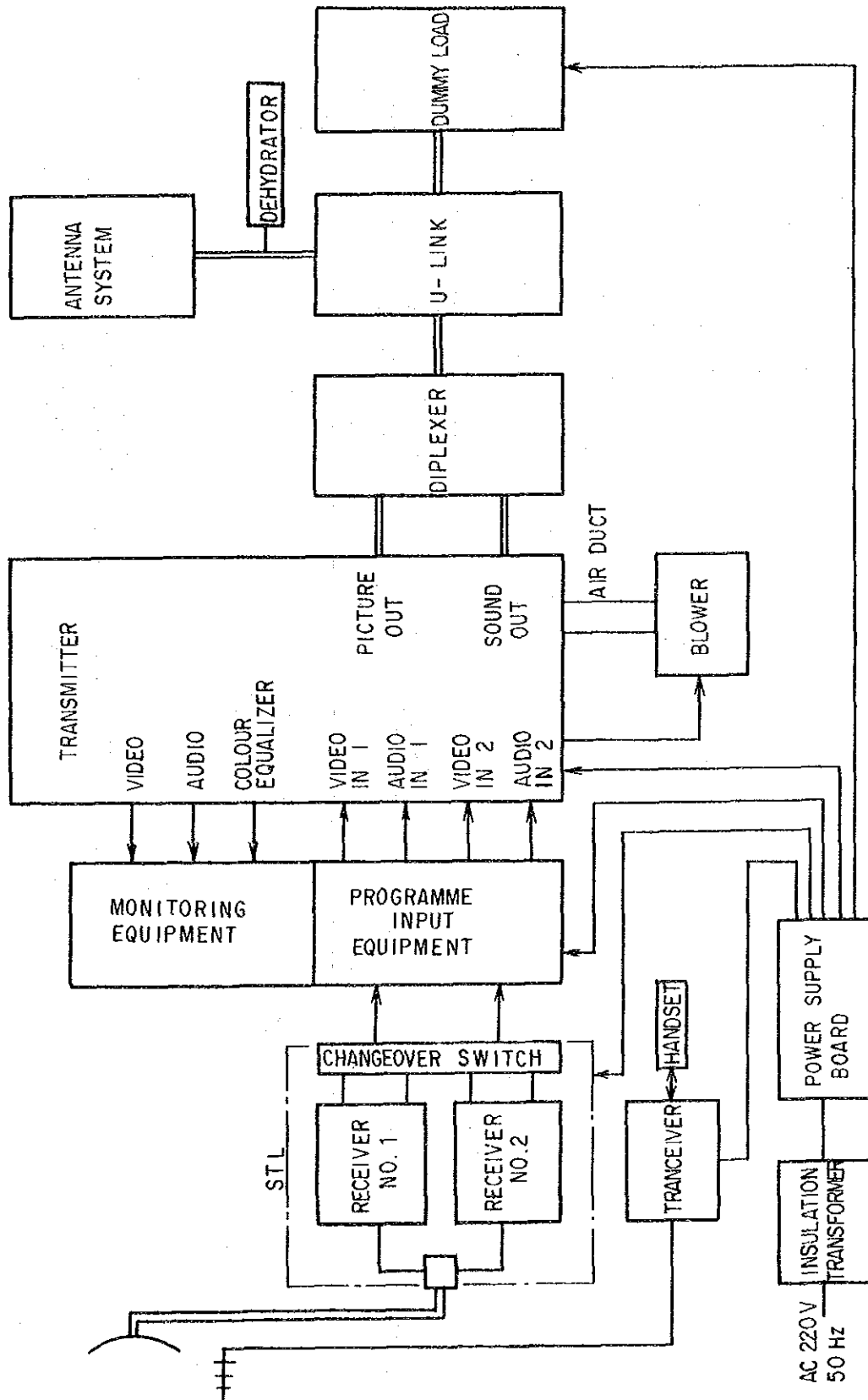


FIG. TX - 1 SCHEMATIC DIAGRAM OF TRANSMITTING STATION

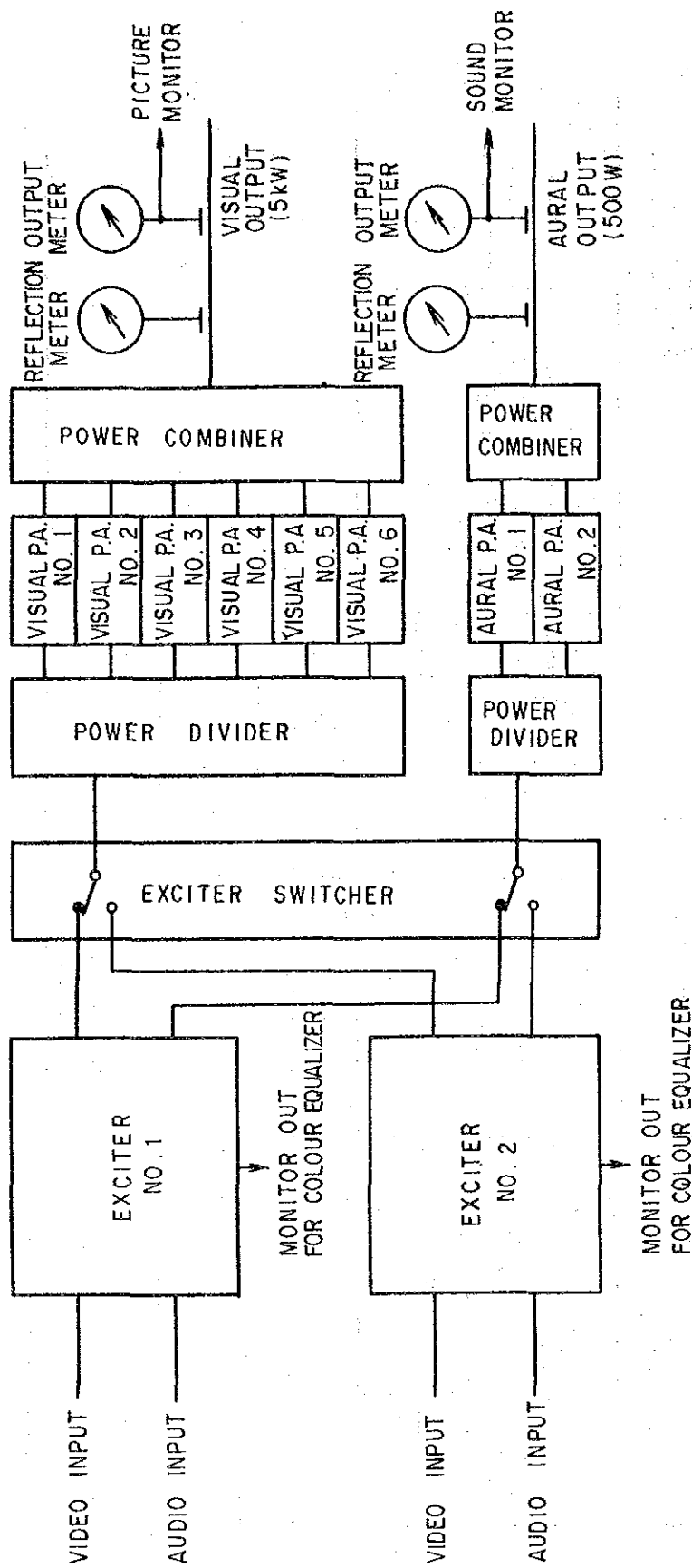


FIG. TX-2 SCHEMATIC DIAGRAM OF  
5kW TV TRANSMITTER

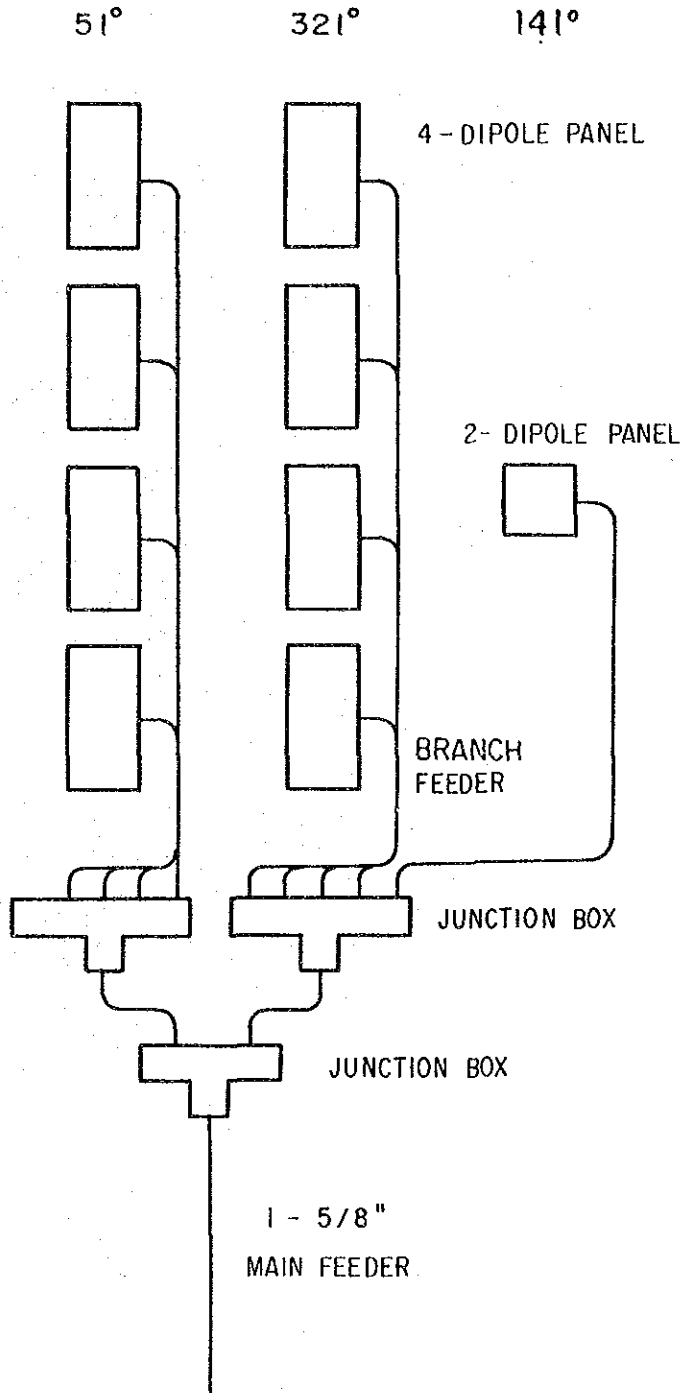


FIG. TX-3 SCHEMATIC DIAGRAM OF ANTENNA SYSTEM

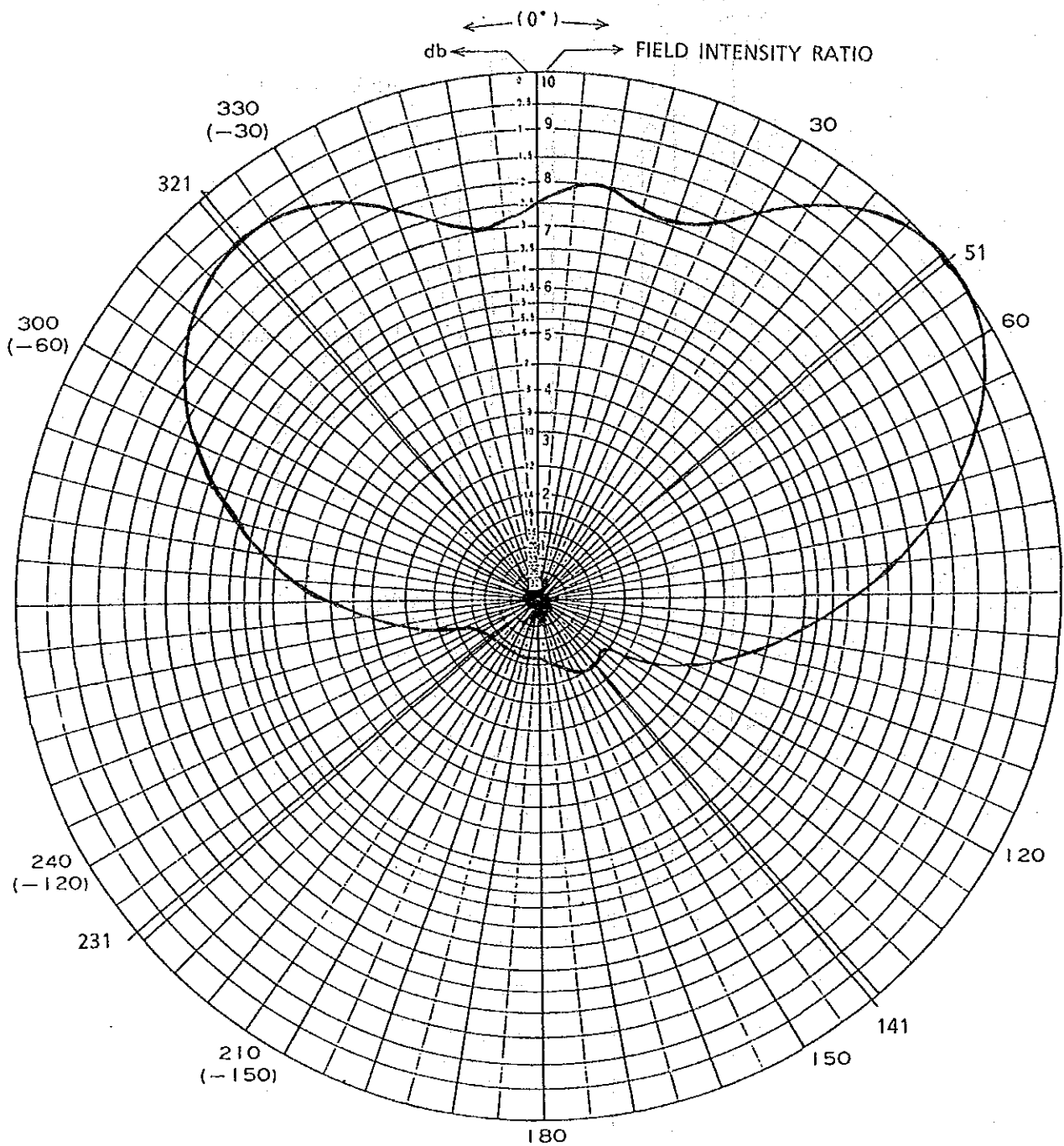
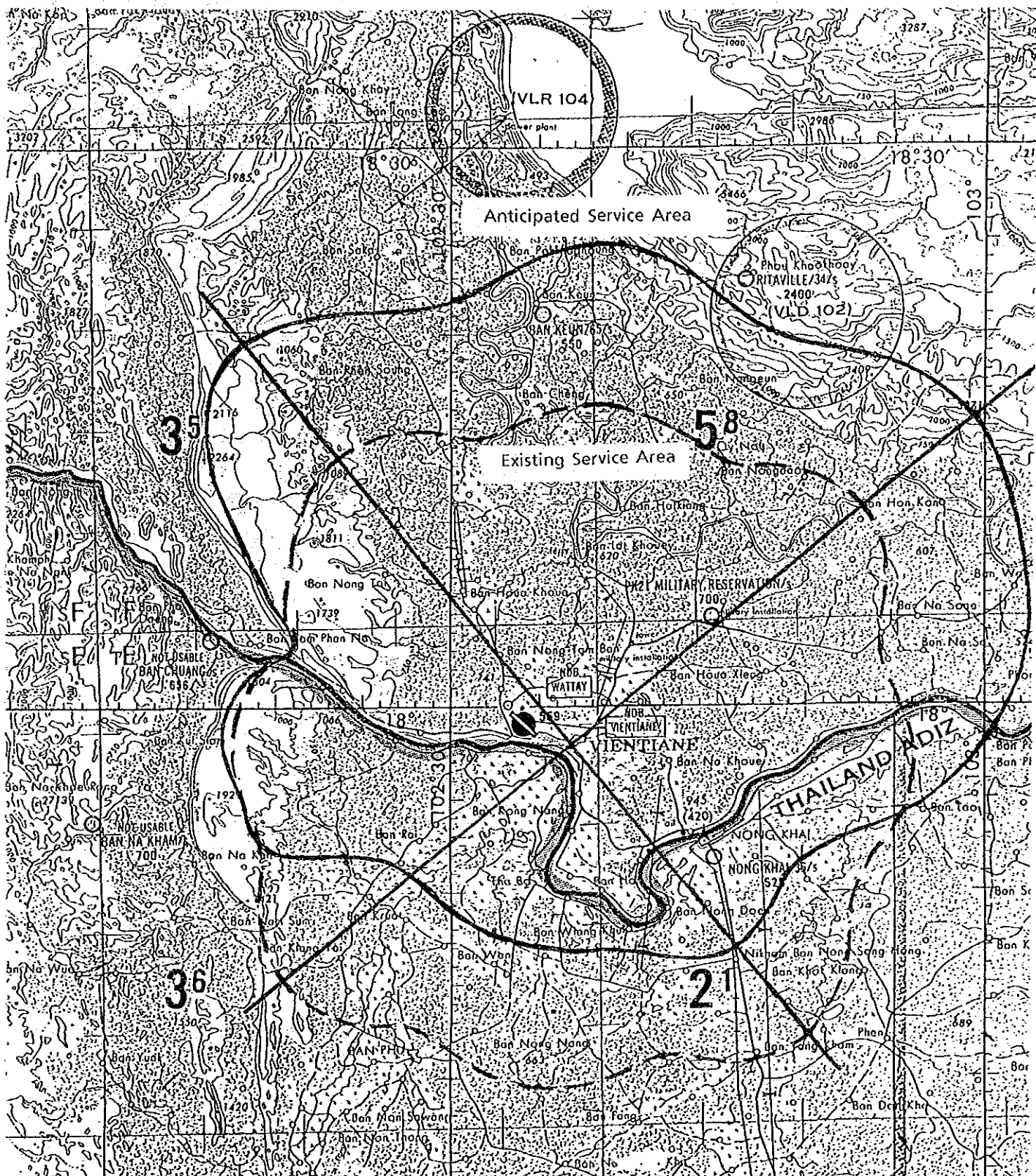
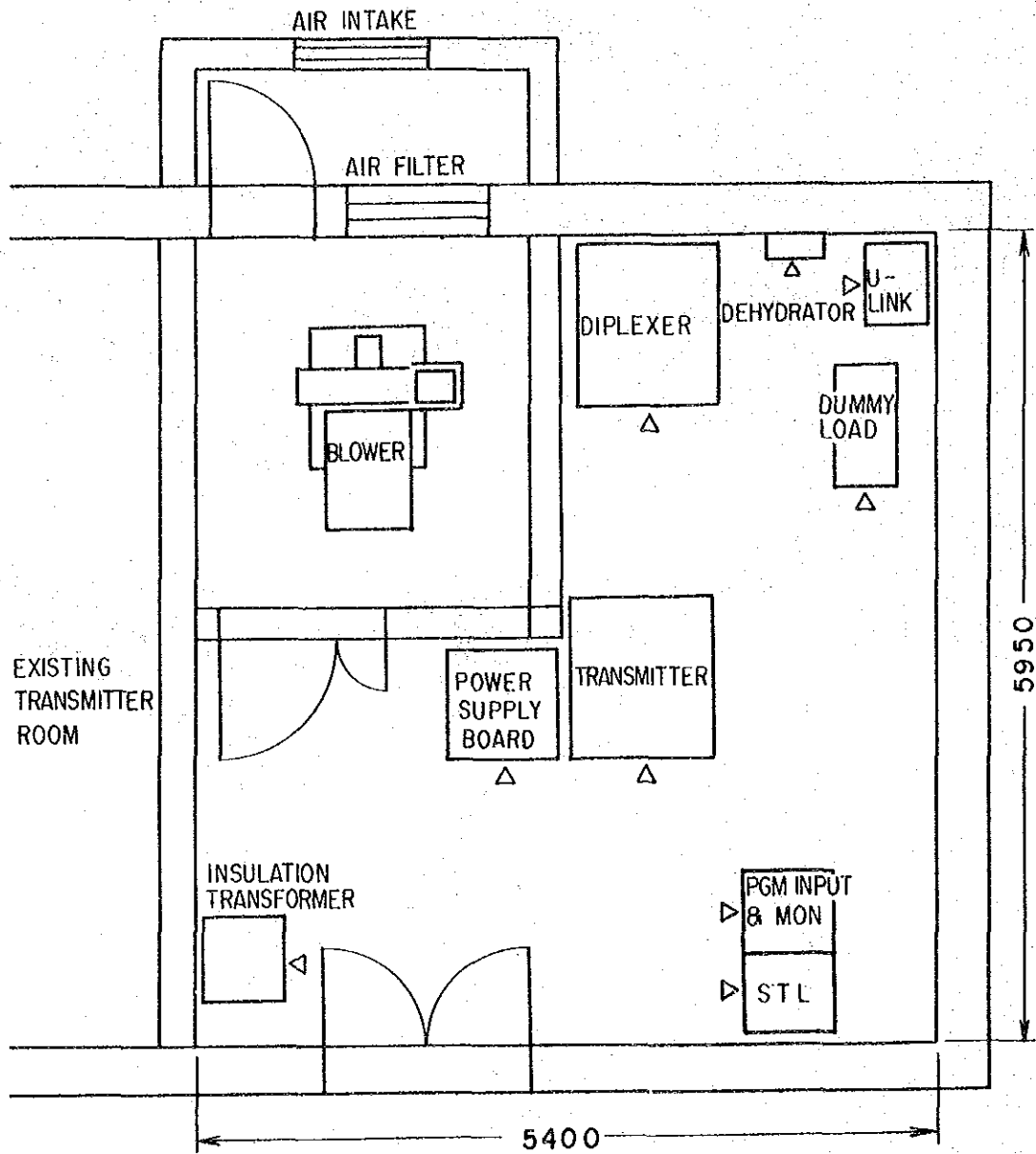


FIG. TX-4 HORIZONTAL DIRECTIVITY OF ANTENNA



—— Anticipated Service Area  
 - - - - Existing Service Area

FIG. TX-5 ANTICIPATED SERVICE AREA

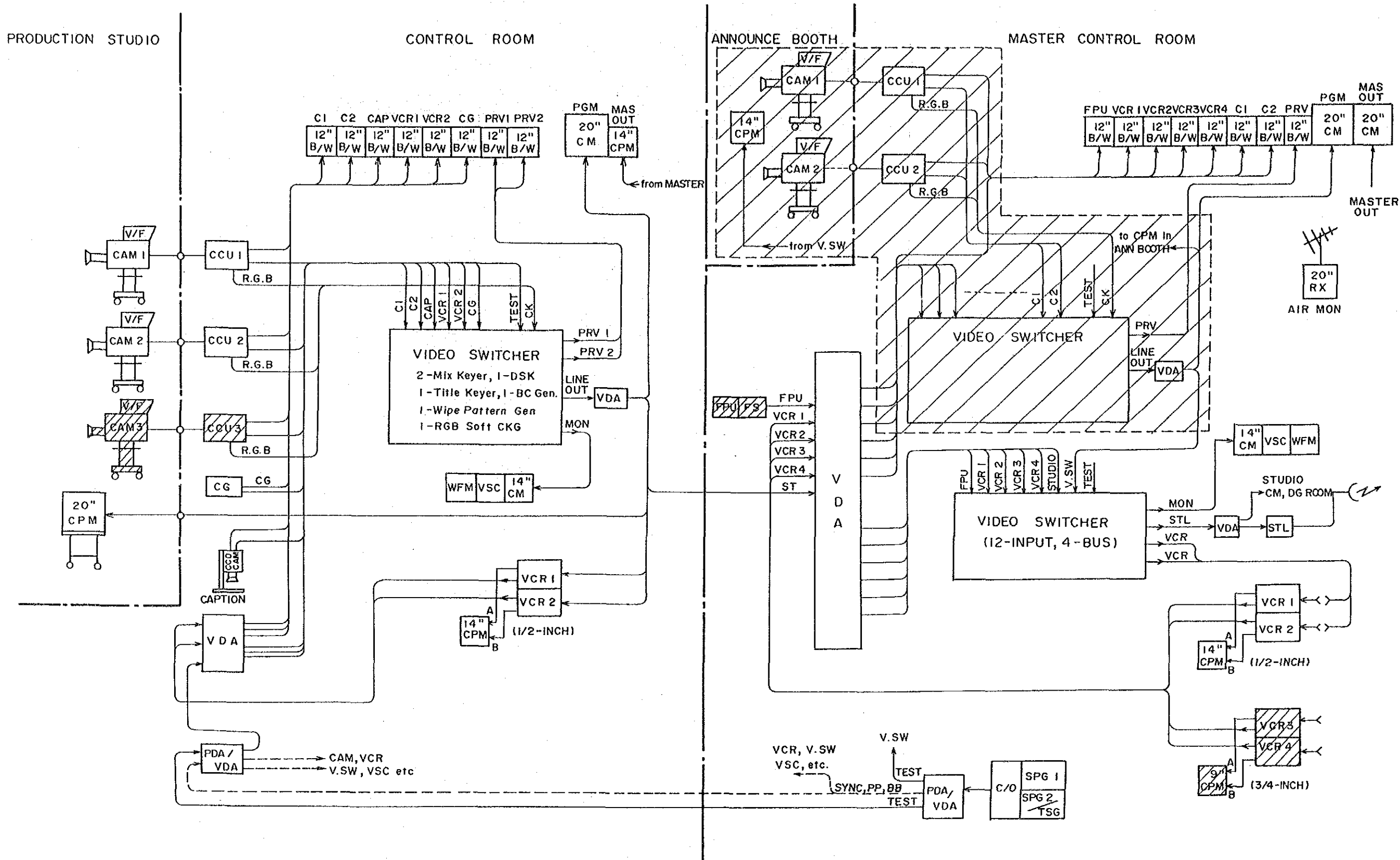


NOTE : Δ SHOWS OPERATING FRONT

FIG. TX-6 EQUIPMENT LAYOUT OF TRANSMITTING ROOM

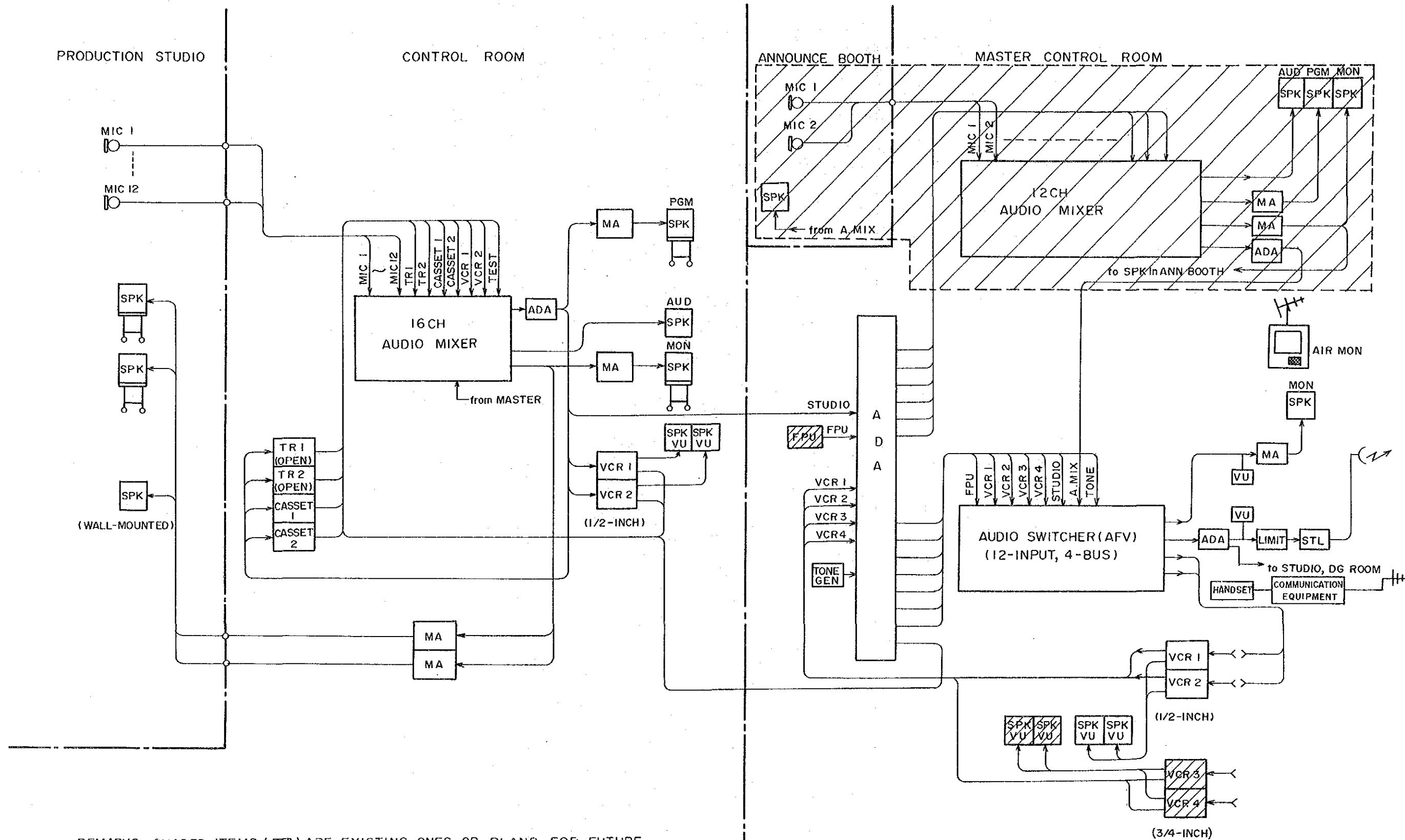






REMARKS: SHADED ITEMS (▨) ARE EXISTING ONES OR PLANS FOR FUTURE.

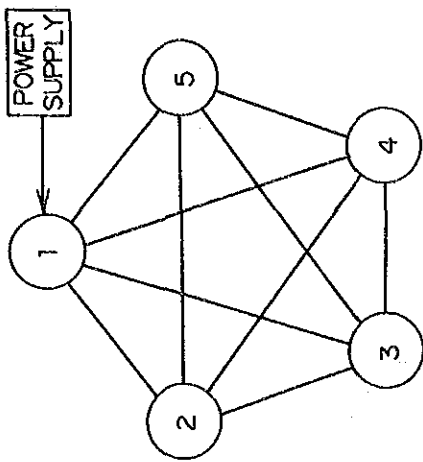
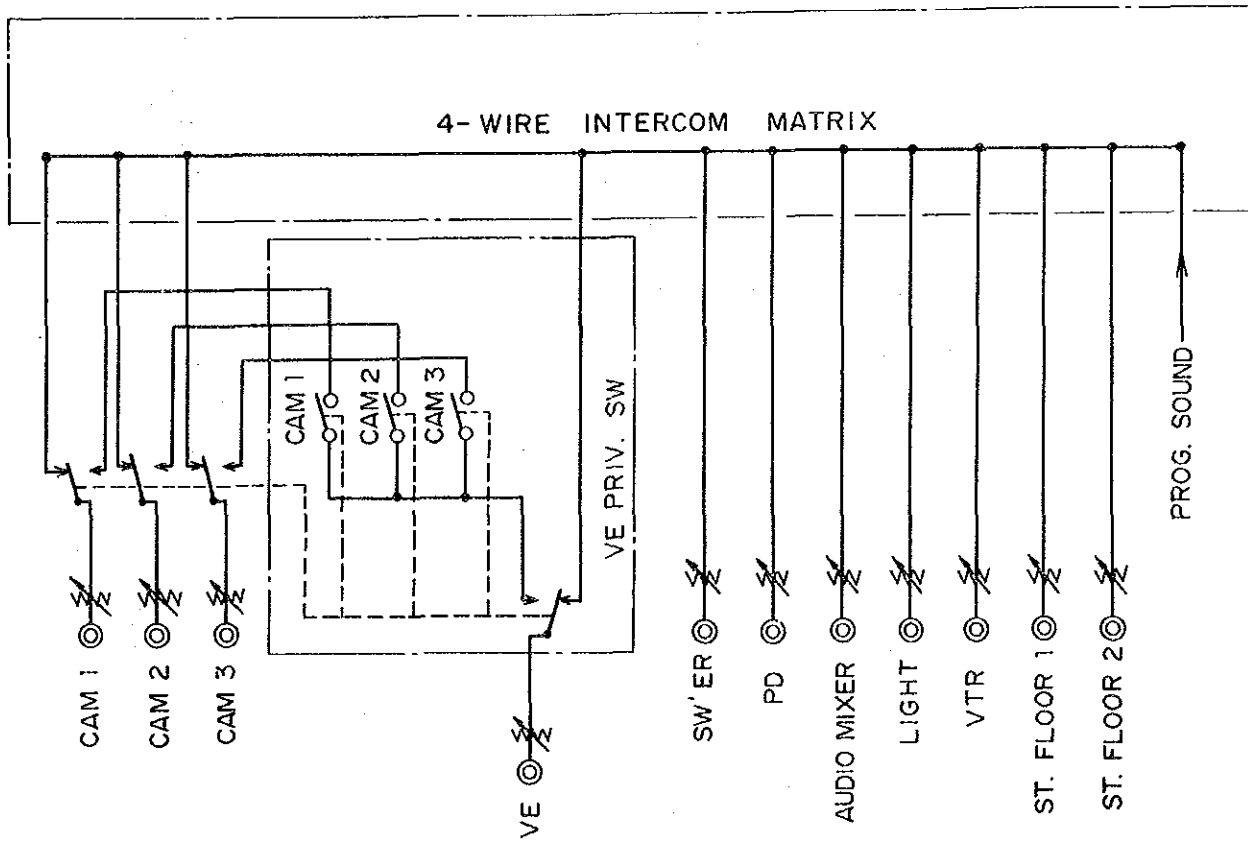
FIG. ST-1 SCHEMATIC DIAGRAM OF STUDIO VIDEO SYSTEM



REMARKS: SHADED ITEMS (▨) ARE EXISTING ONES OR PLANS FOR FUTURE.

FIG. ST-2 SCHEMATIC DIAGRAM OF STUDIO AUDIO SYSTEM





- ① : Master Control Room
- ② : Production Control Room
- ③ : Editing Room
- ④ : Dubbing Room
- ⑤ : STL Room

FIG. ST-3

SCHEMATIC DIAGRAM OF STUDIO INTERCOM AND INTERPHONE SYSTEMS

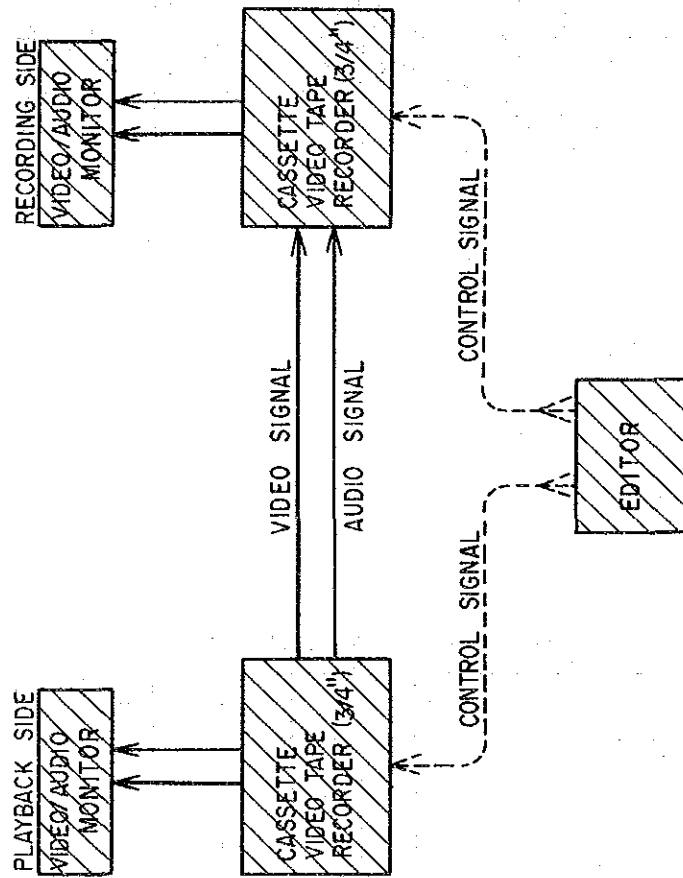


FIG. ST-4 SCHEMATIC DIAGRAM OF EDITING SYSTEM



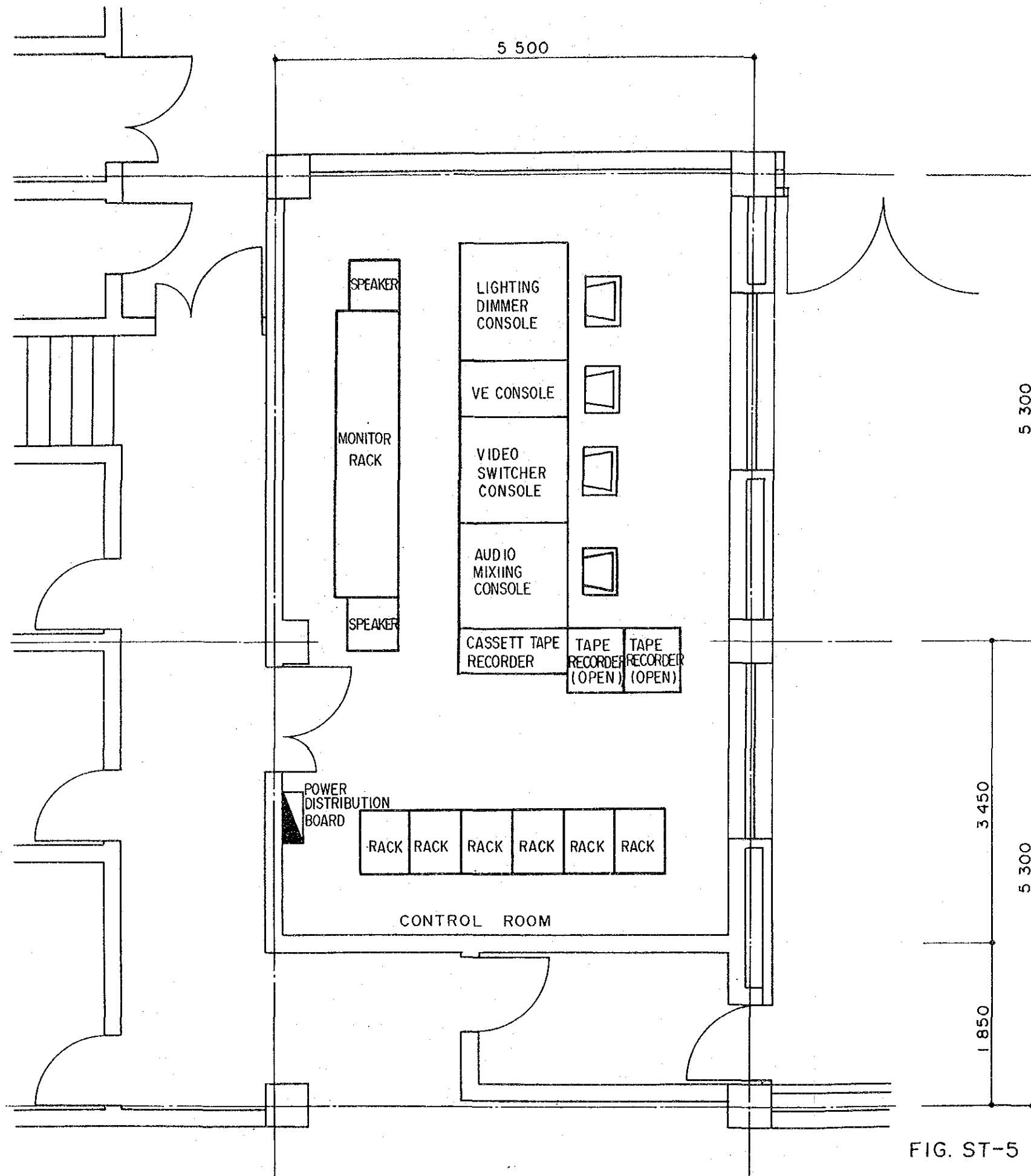


FIG. ST-5 EQUIPMENT LAYOUT OF STUDIO CONTROL ROOM







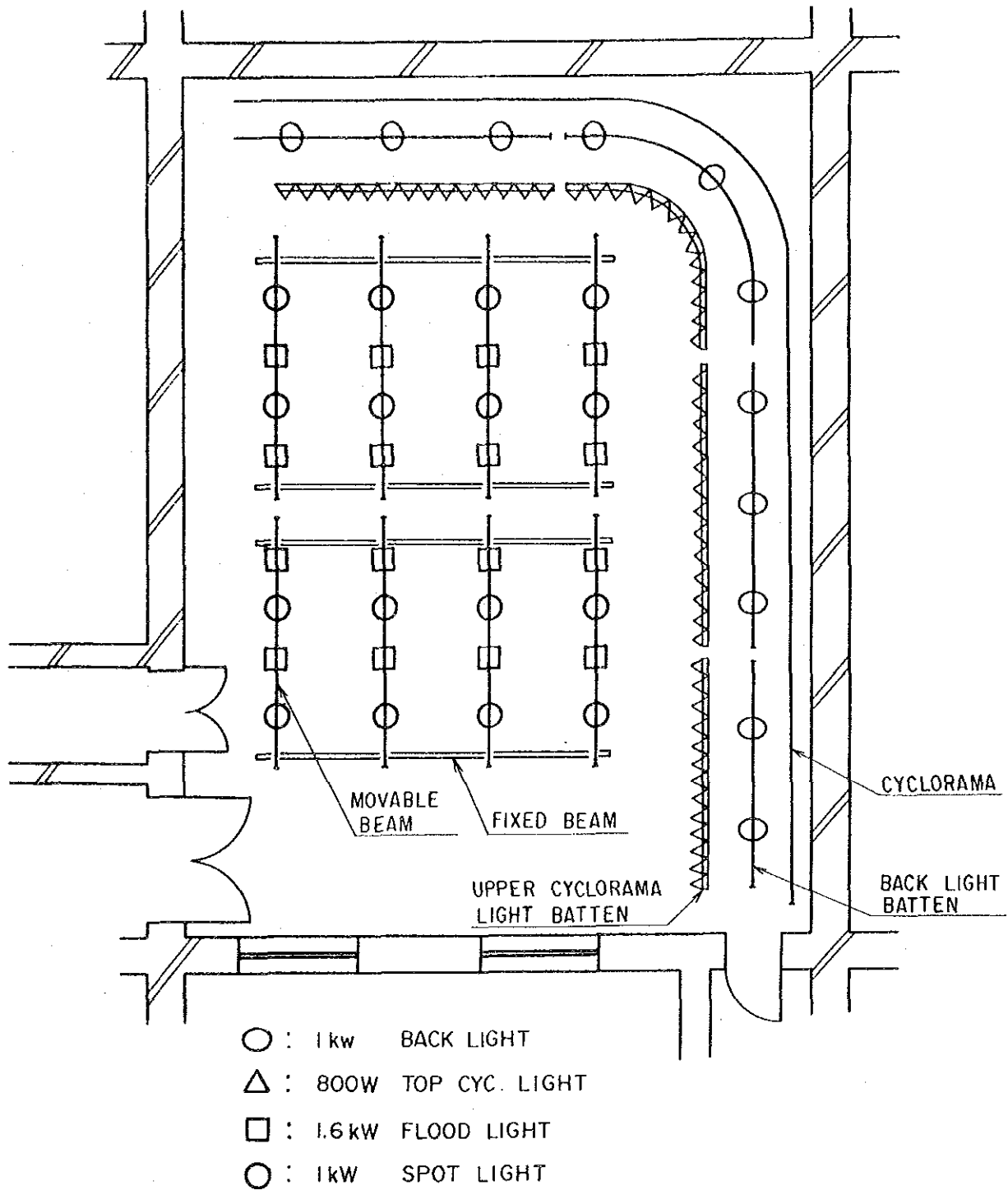


FIG. ST-6 STUDIO LIGHTING LAYOUT





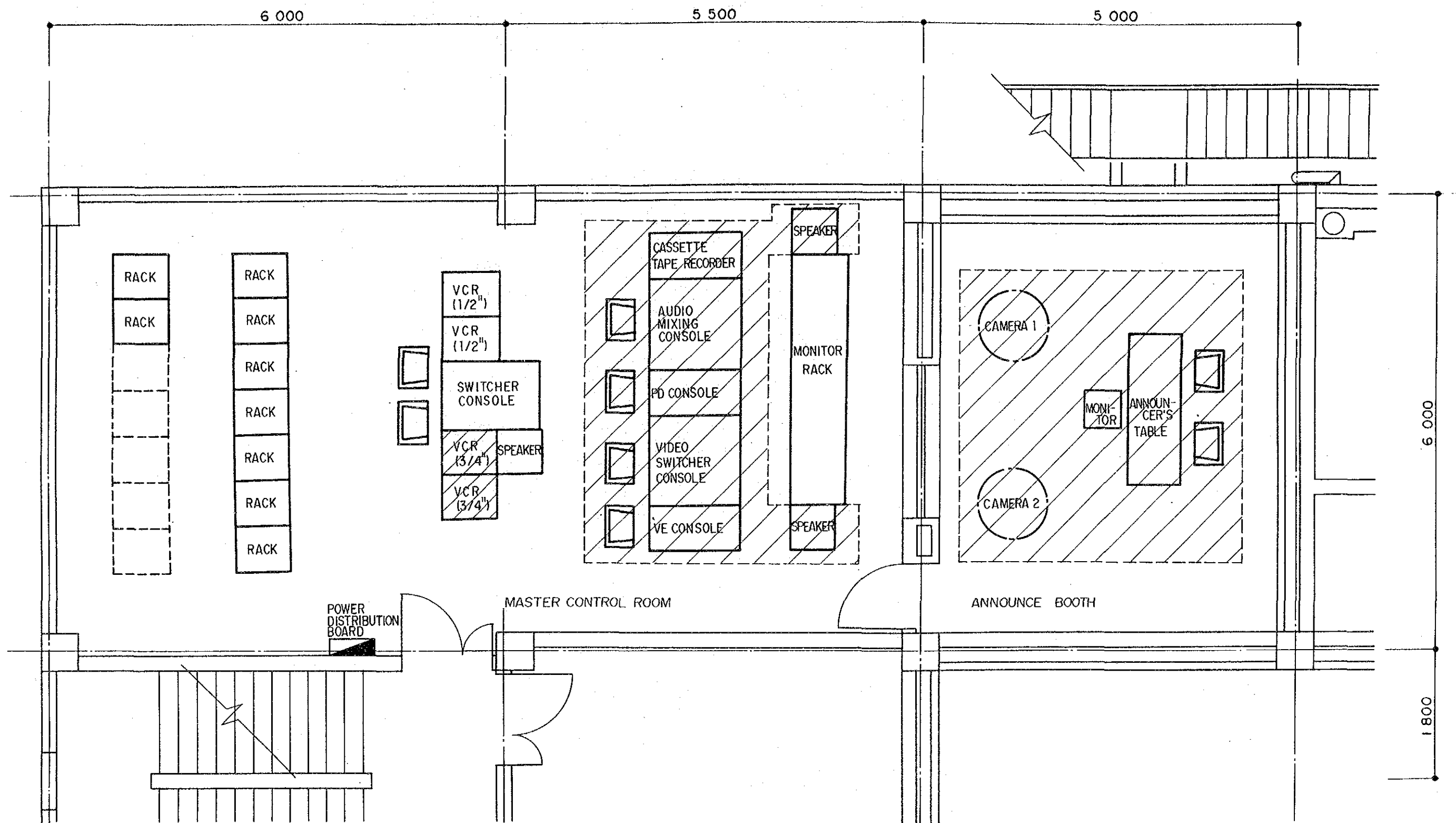


FIG. ST-7 EQUIPMENT LAYOUT OF MASTER CONTROL ROOM







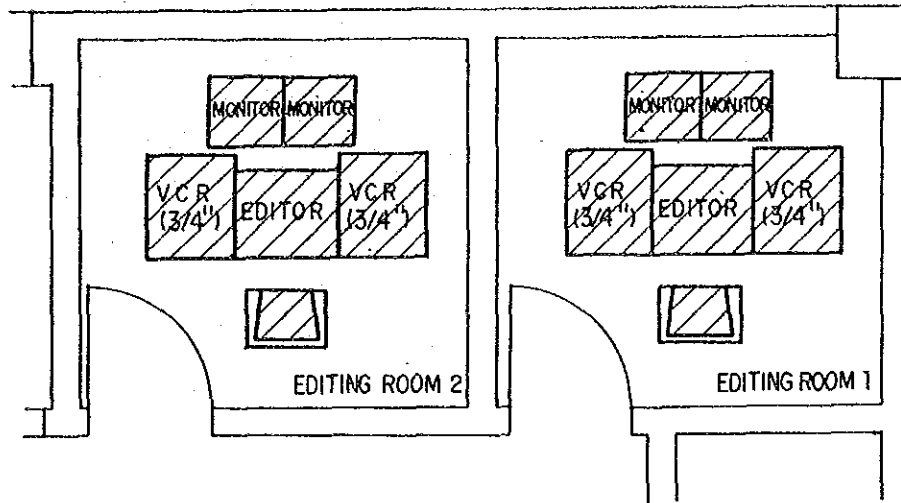


FIG. ST-8 EQUIPMENT LAYOUT OF EDITING ROOM

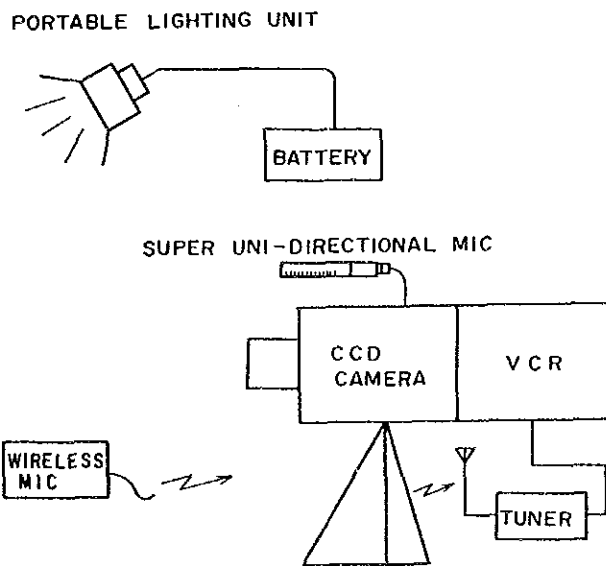


FIG. ST-9 SCHEMATIC DIAGRAM OF ENG EQUIPMENT



## 4-4 Construction Plan

### 4-4-1 Construction Policies

#### (1) Basic Policies

The new facility to be constructed under this project is an important facility which possesses two functions, viz., the function of TV programme production and the function of TV programme sending-out using a programme transmission link. Many of the conditions of the building are determined by the broadcasting installations and equipment to be housed in it as well as by the steel tower to be constructed on the roof of the building for programme transmission by a microwave link. All the factors, such as the form of the antenna, the method of installing various broadcasting equipment, the amount of heat emitted by such equipment, the amount of power they require and their wiring system, differ according to the specifications of the equipment selected which differ from manufacturer to manufacturer. Therefore, regarding all such matters as the form of the tower including its foundation, designing of the equipment stands, method of reinforcing the concrete for installation of equipment, setting of capacity of air conditioners, layout of the trenches for floor wiring, and the forms, size and positions of the various floor and wall openings, many reviews and adjustments will inevitably have to be made even after the construction work is started. Therefore, in carrying out the construction work, it will be most essential to make adjustments between various items of equipment concerning their detailed workings and interfaces, with the consultant playing the central role of coordination. Based on the foregoing, the following shall be the basic policies to be followed in carrying out the construction work.

- 1) Concerning the construction of the new facility, the contractor shall realize the importance of the building and shall ensure that the quality of the building materials and that of various finishes are in conformity with the specifications. Above all, regarding the construction of the many rooms around the studio, utmost attention shall be given to the securing of airtightness so that necessary acoustic characteristics may be maintained.
- 2) Regarding the installation of equipment, the installation contractor shall have a constant grasp of the progress of the construction of the building so as to avoid delays in the

installation work. In order to do so, the installation contractor shall act quickly in setting various construction conditions and, at the same time, shall conduct detailed adjustments of the construction schedule with the construction contractor concerning such matters as the time of bringing the equipment into the construction site, the period of installation and that of the test operation and adjustments of the equipment.

- 3) The two contractors mentioned above, the client and the consultant shall be responsible for their respective work and shall cooperate so as to ensure coordination and smooth running of the construction work.

## (2) Contractors and Their Systems

This construction work consists of the construction of the building and the installation of broadcasting equipment. In order to ensure that the construction work is completed within the restricted term of work as a Grant Aid project, it is necessary to have the work undertaken by Japanese firms that have rich experience and ample ability in their respective fields.

Local construction firms can participate in the construction work as subcontractors. While, in the Lao PDR, there reportedly are about 70 construction firms at present, the number of those that are capable of undertaking construction work of over 100,000,000 kips (about 20 million yen) is said to be only about 15. These firms are invariably of a small scale, just about that of a small Japanese engineering firm with only several employees. Almost all such firms each have a total work force of not more than 40-50 workers even if temporary workers were included. Consequently, as far as the local construction firms are concerned, the orders will have to be placed separately with several of them selected as subcontractors. As will be mentioned later, almost all of the finish materials and building materials and equipment will have to be procured from neighbouring Thailand. Thus, key points in ensuring smooth progress of the construction work as a whole will be to procure and supply the building materials in an appropriate manner and to conduct adequate overall management of subcontractors.

(3) Construction Management Personnel Plan

As mentioned earlier, the new facility being a technical building to house broadcasting equipment, there are numerous conditions to be proposed from the viewpoint of the users of the broadcasting equipment, particularly the conditions that need to be met in order to ensure that the facility performs properly as a TV studio. As to the electricity installations, especially with regard to the power sources for the broadcasting equipment, interfaces include various factors, such as, the capacities of various types of switches, wiring systems and wiring routes. As to the installation of air-conditioning and sanitary equipment, there are a number of important matters to be paid attention to in order to ensure that the noises issued by various units of equipment do not intrude into the studio; such as, the sound-absorption treatment of the air-conditioning ducts and measures taken to give vibration-proof and noise-proof treatments to the various units of building equipment such as air conditioners and pumps. Even during the construction work, numerous adjustments will need to be made with the engineers in charge of the installation of equipment. Hence, in this construction work, it will be absolutely necessary to send from Japan Japanese installation management personnel who are well versed in such work and who have high technical skills in that field. So, in addition to the construction management personnel, one building equipment engineer will have to be sent to the Lao PDR from Japan.

Furthermore, as to the sound-absorption interior finish work required by the studio-related rooms and as to the structural-steel erection work required in the upper part of the studio and the structural-steel erection work as a part of the work to construct the tower on the roof of the building, it must be noted that these are both special types of construction work for which there is no specialist worker in the Lao PDR. So, it will be necessary to send to the Lao PDR for a short period a specialist engineer from Japan for each category of the above-mentioned work dealing with structural-steel erection.

Regarding the construction management personnel, it will also be necessary to consider sending from Japan for a short period one construction engineer in addition to the field-office director on the construction site.

The job classification, numbers and periods of dispatch from Japan of the Japanese construction management personnel are as follows:

[ Construction Management Personnel ]

- Field-office Director = 1 person × 12 months  
(whole construction period)
- Construction Engineer = 1 person × 6 months (3 months × 2)
- Building Equipment Engineer = 1 person × 10 months
- Clerical Staff = 1 person × 12 months

[ Specialist Technicians ]

- Studio Interior finish Worker = 1 person × 3 months
- Structural steel Erection Worker = 1 person × 3 months

4-4-2 Construction Situation in the Lao PDR and Matters Needed to be Taken Note of in Conducting the Construction Work

(1) Securing of Building Materials

According to information obtained informally from the Ministry of Planning, Economy and Finance in the Lao PDR, the total monetary value of the construction works carried out in the Lao PDR during the last five years is about 3 billion kips (about 600 million yen), or an average annual amount of about 120 million yen. As this figure shows, the construction industry in the Lao PDR is by no means a major industry. For the supply of building materials, too, the Lao PDR depends almost entirely on imports. In Vientiane, there are a number of stores selling building materials which are mainly imported from Thailand. The range of products handled by these stores is extremely limited in both types and quantities, although there is a great variety of products sold; from the interior finish materials such as boards and tiles to tools for piping and wiring, lighting instruments and air conditioners. Supplies are generally so short that buyers must wait 2-3 months before they get what they order.

Meanwhile, with regard to cement, which is among the most important building materials, the Lao PDR used to import it from Thailand until the year before last (1989), but Thailand in March 1990 banned the export of cement on the grounds that the nation's own domestic demand

and supply situation had become extremely tight. As a result, in the Lao PDR, it has become difficult to obtain cement of good quality. At present, in the market, cement from Vietnam, the Soviet Union, China, etc., are sold but the products of Vietnam and the Soviet Union are both uneven in quality and lack reliability in strength as well. Therefore, in this construction work, the Chinese products, when the case is deemed suitable, will probably be used. In any case, what is extremely important in carrying out this construction work will be to secure cement and other building materials in a timely manner in accordance with the construction schedule.

As will be mentioned later in this report, almost all of the building materials will be procured from neighbouring Thailand. But it must be noted that general exports of Thai products require the permission of the national bank and national security committee of Thailand and also that it normally takes 2-3 months for the ordered materials to arrive in the Lao PDR after the procurement order is placed. For that reason, it is necessary for the construction contractor to handle quickly and systematically all the procedural work relating to the procurement of building materials.

(2) Considerations Required to be Given to Meteorological Conditions

The Lao PDR has a high-temperature high-humidity climate that is unique to a country located in the tropical zone. The monthly average temperature in Vientiane is quite high and without much variation throughout the year, ranging from 22 to 28°C, the lowest being 21.7°C in December and the highest, 28.8°C in April. The annual average rainfall exceeds 1,600mm, which is larger than in Tokyo. The rainfalls concentrate during May-September when a monthly average of 250-300mm is recorded. According to the construction schedule under this project, the earth work and building-frame construction work are expected to take place in the rainy season. Therefore, full consideration needs to be given to rainwater drainage at the time of digging and to the prevention of rainwater filtering into the concrete. Furthermore, with regard to the work to raise the ground level under the concrete slabs on the grade, minute attention is necessary because the work may sometimes cause the sinking of the floor slabs when the rolling is inadequate. In order to prevent the concrete from cracking owing to sudden drying, it is essential that,

in conducting the concrete-placing work, preventive measures be taken, such as avoiding the daytime when the temperature is high.

#### 4-4-3 Construction Supervision Plan

##### (1) Supervision Policies

Based on the fundamental idea of the Japanese government's Grant Aid system, the consultant needs to bear in mind the objectives of the basic design and to organize a consistent project execution team to coordinate the construction supervision work as well as the work to prepare drawings and specifications for design presentation, coordination of the opinions of the different departments concerned and to thereby endeavour to ensure smooth completion of the project. The following shall be the concrete basic policies of the supervision work:

- 1) Importance shall be attached to the coordination of the construction work and the equipment installation work and utmost effort shall be made to ensure that both of the two types of work will be completed without delay within the term of work.
- 2) The consultant shall keep in close touch with the organizations concerned and the officials in charge in both countries and shall submit necessary reports to them and, meanwhile, shall give appropriate and prompt advice and guidance to the contractors so as to ensure smooth progress of the construction work.
- 3) With regard to the construction method, construction techniques, etc., the consultant shall maintain the approach of conducting technological transfers from Japan to the Lao PDR, so that this project may prove truly effective as one carried out as a Grant Aid project.

##### (2) Contents of the Supervision Work

###### 1) Work concerning Construction Contracts

Full cooperation regarding such matters as the preparation of drawings and specifications for design presentation and of tender documents, preliminary examinations of the qualifications of the contractors, tender, tender evaluations and selection of contractors, preparation of construction contracts, attendance at the signing of the contracts, etc.



2) Examination of Submissions by the Contractors

Examination and approval of submissions from the construction contractors, such as the equipment manufacture plan, construction plan, samples of materials and finishes, the equipment to be installed, and supplies.

3) Guidance concerning Construction Work

Examination of the construction plan and construction schedule, guidance given to the contractors, and submission of regular reports to the client concerning the progress of the construction work.

4) Cooperation concerning the Procedures to Obtain Payment Approvals

Cooperation concerning the examination of the contents of the invoices submitted by the contractors for the construction expenses payable during and after the completion of the construction work, and cooperation in the payment procedures.

5) Attendance at Inspections

The consultant shall be present at, and approve various kinds of, tests and inspections which will be conducted from time to time during the entire period from the start of the construction work to its completion. At the same time, the consultant shall report from time to time to the officials concerned of the Japanese government on necessary matters regarding the progress of the construction work, payment procedures, completion and handing-over. The consultant shall also confirm that the construction work has been completed and that all the contractual terms and conditions have been fulfilled, and, after doing so, shall be present at the delivery of the objects of the contract and complete its work after obtaining a formal acknowledgement of acceptance.

(3) Supervision Personnel Plans

1) Construction Supervision Personnel

The most important things in carrying out the supervision work for this construction project are not only to secure the quality of the facility to be constructed as a broadcasting studio but

also to ensure that the coordination of the construction work with the equipment-installation work and the technical and clerical negotiations with the client and the contractors are both carried out smoothly. Therefore, the construction supervision personnel to be selected shall be those who have a broad view of things and coordinating ability in addition to rich experience and appropriate technological judgment. So, one on-site supervisor will be staying in the Lao PDR when necessary during the construction period for supervising the construction work.

2) Equipment-installation Supervision Personnel

This project requires assembling of various complicated systems, such as the TV production studio, ENG equipment, and programme sending-out/TV transmission installations, with the result that a great variety of equipment will have to be supplied. So, in order to carry out the installation work smoothly and efficiently within the restricted term of work, there is the need of sending from Japan the right type of specialist engineers to the Lao PDR at the right time. Furthermore, in any project, the installation period required is largely determined by the time taken by the process of transportation and customs clearance of the cargoes. In a project like this one, even greater attention needs to be given to this point because of the large quantities of precision machines being transported. Hence, it is necessary not only to select companies with rich experience but also to examine the implementation schedule with utmost care and draw up a detailed work plan. Furthermore, it is of primary importance to ensure that information and data are fully exchanged with the Lao side so that the two sides may cooperate closely to enable smooth joint execution of this project.

Bearing in mind the basic policies and key points mentioned above, the consultant shall assign appropriate personnel, keep in close touch with not only the organizations concerned on the Japanese side but also those on the Lao side, and shall thereby endeavour to ensure smooth progress of the construction work. The consultant shall also greatly endeavour to prevent the occurrence of problems or accidents and, should any problem arise

despite such efforts, shall give appropriate and timely guidance and advice to expedite its solution.

#### 4-4-4 Procurement Plans for Materials and Equipment

##### (1) Procurement Plans for Building Materials

The building materials produced in the Lao PDR are currently confined to such primary products as the aggregate for concrete, blocks and bricks. The Lao PDR depends almost entirely on imports for building equipment as well as for all types of building materials including cement, reinforcements, structural steel, paints and various types of finish materials for interior use. These imports are mostly from Vietnam, China, the Soviet Union and other socialist countries, and neighbouring Thailand. The imported products from Thailand are most abundant and excellent both in variety and quality, and are also reliable with regard to their supply. The building materials to be imported from Japan will be very limited, so that the materials to be used in this project shall in principle be those procured in the Lao PDR or imported from Thailand. The materials to be imported from Thailand shall be procured in Bangkok and will be transported to the project site via the routes and by the methods mentioned as follows:

Bangkok	—	Nong Khai (Thai inland transport)	= Trucks
Nong Khai	—	Thanareng (crossing the border)	= Ferry
Thanareng	—	the project site in Vientiane	
		(Lao inland transport)	= Trucks

The time required for transport as mentioned above would be about 1 week to 10 days including the export-import procedures at Nong Khai — Thanareng. However, since a considerable time will be required in taking the necessary procedures to obtain export permits from the Thai authorities, the procurement of materials in Thailand will have to be conducted under a carefully planned schedule.

Table 4-4-1 shows a list of the main building materials classified by the sources of procurement.

Table 4-4-1 List of Main Building Materials by Procurement Sources

Materials	Procurement Sources		Remarks/Reasons for Selection
	Laos	Thailand	
(Construction Work)			
• Aggregate	○		• No problem with regard to hardness, grain-size distribution and available quantity of supply.
• Cement	○	△	• Chinese product or to be imported from Thailand.
• Reinforcement and structural steel		○	• To secure quality.
• Roofing materials		○	• Since asbestos cement corrugated sheet and bent-metal plates, both of which are in general use in this country, are unfit for this facility, roof-tiles manufactured in Thailand will be used.
• Bricks	○		• Product of Laos. No problem about quality.
• Stone materials	○		• Since only a small quantity is needed, the imported products available in Laos will be used.
• Plastering materials	○	△	• Only the mix-in materials (e.g. waterproofing agent) will be procured from Thailand.
• Wooden fixtures	○		• No problem about the quality.
• Aluminum and steel fittings		○	• Cannot be manufactured in Laos.
• Other interior finish materials		○	• These are such materials as paints, ceiling materials, vinyl tiles, interior finish materials for the studio and miscellaneous metal fittings, all of which cannot be procured easily in Laos in adequate amounts.
(Installation Work)			
• Distribution boards, electric wires, conduit pipes, lighting fixtures, switches, plugs, water-tank pumps, piping materials, air conditioners, ventilation fans, duct materials, sanitation fixtures, etc.	△	○	• In order to secure quality and quantity, these items will, in principle, all be imported from Thailand.

(2) Procurement Plans for Broadcasting Equipment

Various equipment and their accompanying units and installation materials shall be procured in Japan. However, only the Lao language word-processor for use in inserting texts into TV pictures, will be procured locally, since such a word-processor will probably not be procurable in Japan. The equipment and installations will be inspected, each as a unit or a system, in Japan after assembly (factory inspection) and will be shipped after dismantling where necessary. Upon arrival in the Lao PDR, they will be installed and their original forms will be restored.

4-4-5 Implementation Plan

(1) Sharing of the Work by the Two Countries

When implementing this project as a Grant Aid project, it is considered appropriate to define the ranges to be implemented by the governments of Japan and the Lao PDR as outlined below. Of these, the construction work to draw electricity and water into the site, which is to be undertaken by the Lao side, will both need to be completed by the time the construction of the studio building is completed.

1) Range to be Undertaken by the Japanese Side

- a) Construction of the new studio building.
- b) Construction of a new entrance gate.
- c) Construction of roads on the premises.
- d) Supply and installation of broadcasting equipment (including the remodelling of the existing transmitting station).

2) Range to be Undertaken by the Lao Side

- a) Development of the ground for construction work (including removal of obstacles).
- b) Construction of the fence on the site.
- c) Drawing of electricity and water into the site.
- d) Drawing of telephone lines into the site.
- e) Provision of furniture and fittings that are not fixed.
- f) Construction work for landscaping of the site.
- g) Transferring and installing of existing broadcasting equipment to the new site.

- h) Taking of necessary legal procedures required in the Lao PDR in implementing this project.
- i) Payment of bank commissions (including the fee payable for the Japanese foreign exchange bank's notice on the issuance of payment authorization based on inter-bank arrangement, and payment commissions).
- j) Customs clearances and duty-exemption procedures concerning the building materials and equipment and various items of broadcasting equipment to be imported.
- k) Appropriate and efficient maintenance and operation of the facilities and equipment constructed or provided.

(2) Implementation Schedule

This project will be composed of two phases and each phase will be completed through the following procedures. After the conclusion of the E/N between the governments of Japan and the Lao PDR, a consultancy contract will be signed between the Government of the Lao PDR and the consultant company of Japan, to be followed by the implementation designing, preparation of drawings and specifications for tender and the holding of the tender. After the post-tender examinations, a construction contract will be concluded and the construction work will be started. The above procedures will require a total of about six months.

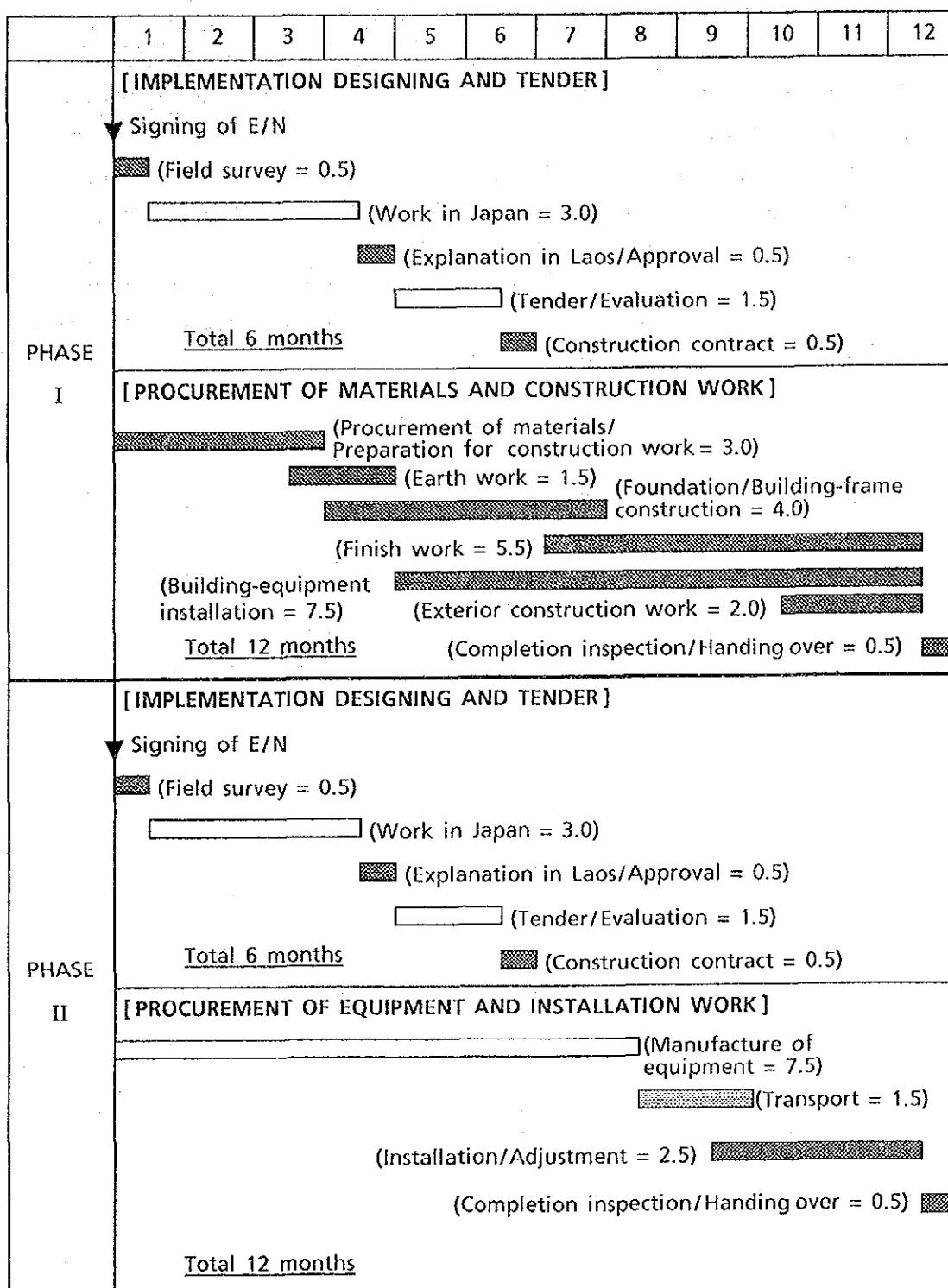
The construction period of phase 1 shall be about 12 months, as the construction of the facility shall be carried out.



The term of phase 2 for the procurement and installation of broadcasting equipment shall also be about 12 months.

The total construction period through phases 1 and 2 is anticipated to be 24 months.

The implementation schedule is shown in Table 4-4-2.

Table 4-4-2 Project Implementation Schedule



 Work in the Lao PDR  
 Work in Japan

#### 4-4-6 Estimate of the Approximate Project Cost

Approximate project cost to be covered by the Lao side is estimated at about 26,840,000 kips (about 5,000,000 yen) as shown below.

1) Ground development work	840,000 kips
2) construction of fence on the site	5,100,000 kips
3) Drawing-in of electricity and water	15,500,000 kips
4) Drawing-in of telephone lines	2,100,000 kips
5) Furniture, fittings, etc.	3,300,000 kips

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Total 26,840,000 kips



**CHAPTER 5    EFFECTS OF THE PROJECT  
AND CONCLUSION**



## CHAPTER 5 EFFECTS OF THE PROJECT AND CONCLUSION

The effects of the project are shown in the following Table 5-1

Table 5-1 Effects of Implementation of the Project and Degrees of Improvements Expected on the Present Status

Present Status and Problems	Measures to be Taken in This Project	Effects of the Project and Degree of Improvements Expected
<p><b>TV WAVES</b> Lao National Television currently covers only about 400,000 people. Moreover, TV waves intrude from Thailand on the same channel as that of Lao National TV, thus causing interference (about 150,000 people) and substantially degenerating the reception quality of broadcasts in the Lao PDR.</p>	<p>The output of the transmitter will be increased from 1kW to 5kW and, at the same time, transmitting antenna will be changed from omnidirectional to directional, facing the direction of the Lao territory. Also, the TV transmission frequency will be changed from Ch-8 to Ch-9.</p>	<p>The service area of Lao National Television will be expanded from the present population of 400,000 to 600,000. The TV interference problem will be solved and the reception quality will be enhanced.</p>
<p><b>PROGRAMMES</b></p> <ol style="list-style-type: none"> <li>1. The existing TV studio building is a conversion from the former radio studio building. The only TV studio in the building has such a low ceiling as compared with the floor area that the camerawork in the studio is inevitably restricted. Moreover, there being only one TV studio, the production of news and that of general programmes often clash with each other, causing the production staffs to wait on many occasions for the studio to be vacated.</li> <li>2. The video and audio installations are composed mainly of general types of equipment and are inadequate both in functions and in absolute number. Owing to a shortage in absolute number of lighting instruments, the TV studio lighting is extremely inadequate. Without a dimmer, delicate lighting control for TV production is impossible.</li> </ol>	<p>By separating the production stages of news from those of general programmes, each of the two will become able to secure its own production time in the studio. Also, the functional rooms will be organically linked together and this will result in the improvement of paths of flow of personnel.</p> <p>Video and audio installations that meet the specifications for broadcasting stations will be provided. Regarding the TV lighting system, too, minimum necessary upgrading will be conducted.</p>	<p>The programme-production efficiency will be enhanced and it will become possible to increase the number of independently-produced programmes and to extend the broadcasting hours as well.</p> <ul style="list-style-type: none"> <li>• Increase of self-produced programmes 45% at present → 60%</li> <li>• Increase of broadcasting hours 3 hours at present → 4 hours</li> </ul> <p>As a result of the renewal of broadcasting installations, the technical quality will be enhanced in all aspects. The programme-production functions will be further upgraded and the qualitative improvement of programmes can be expected as a result.</p>

As outlined above, as a result of implementation of this project, a number of improvements will be made in two aspects which are the basic component factors of TV broadcasting, viz., TV waves and TV programmes. And through the multiple effects of the improvements made in the two factors, the residents in Vientiane and its neighbouring areas will become able to view the programmes of Lao National Television under better reception conditions.

The number of the population living in the new service area of Lao National Television will be 600,000 and the number of households in the new service area can then be estimated at around 86,000 (an average of 7 persons/household).

As mentioned earlier, assuming that an average of one TV receiver is installed in every two households, it can be expected that, in the above-mentioned area alone, some 43,000 TV receivers will have been installed as a result of implementation of the project. (Total number of TV receivers in the Lao PDR is estimated at 32,000 at present.)

Meanwhile, the price of a popular-type TV receiver in Vientiane at present is just about five to six times the amount of the average monthly income of a local worker.

The situation as described above is almost the same as the one that prevailed throughout Japan during the period from 1957 to 1958 when TV receivers spread throughout the country at a spectacular pace. It is considered that the completion of this project will provide a sort of springboard which will help spread the TV receivers in the Lao PDR at a pace much higher than estimated.

Furthermore, some three million more people, who are living outside Vientiane, Luang Prabang or Savannakhet and are unable to receive TV waves directly, will also become able to enjoy the benefits of this project even though in an indirect way, as they will be able after implementation of the project to receive videotaped programmes of high picture quality from the video department of the Ministry of Information and Culture.

The implementation of the project will also prove helpful to the Government of the Lao PDR, particularly in pushing ahead its policy which aims at the enhancement of people's living standard through fulfillment of their basic needs. The reason is that the Government of the Lao PDR would be able to ensure further dissemination of its policies for agriculture and forestry, two of the nation's basic industries, and the spreading of health and sanitation awareness nationwide, even at the present stage of

national development when the infrastructure of the country is not yet fully established, by making effective use of television; through further expansion of TV broadcasting which possesses the three major characteristics of being instantaneous, simultaneous and universal, and also through the distribution of videotaped programmes as the secondary use of TV programmes.

[Reference]

a) Prices of TV receivers, etc.

• 10" monochrome TV receiver (for both alternate and direct currents)	115,000 kips	( \$164 )
• 29-element receiving antenna	13,500 kips	( \$19 )
• 8-element receiving antenna	7,500 kips	( \$11 )
Average salary	20,000 kips	( \$30 )

b) Corresponding examples in Japan in 1958

• 14" monochrome TV receiver	Approx. 65,000 yen	( \$180 )
Average salary	Approx. 15,000 yen	( \$42 )

As mentioned above, this project is not only expected to bring about substantial effects but is also considered to contribute widely to the enhancement of the living standard of the people of the Lao PDR. For that reason, it can be judged to be most appropriate to carry out this project under Japanese government Grant Aid assistance. Regarding the operation and management of this project, too, every step is being taken to ensure their success. Regarding the personnel, for example, Lao National Television has already drawn up its personnel plans for 1992 and thereafter, while, as regards funding, assurance has been given by a finance official at the Ministry of Information and Culture that the funds to cover the operational expenses after completion of the project will be secured without fail. In view of the circumstances described above, it can be considered that there is no problem in carrying out this project, as the Lao side is evidently in full readiness to undertake the project, in terms of both personnel and funds.

Furthermore, the need should also be pointed out to promote cooperation between the two countries in the aspect of software such as supplying TV programmes, in addition to the continuation of technical cooperation through such arrangements as the sending from Japan of experts

and the Japan Overseas Cooperation Volunteers (JOCV) and accepting into Japan trainees from the Lao PDR. This is because such arrangements will contribute not only to the smooth and effective implementation of this project but will also help in further deepening friendship between Japan and the Lao PDR.

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## 1. Member list of the Survey Team



## 1. Member List of the Survey Team

### (1) Basic Design Study

<u>Name</u>	<u>Assignment</u>	<u>Present post</u>
Koichi SAZANAMI	Leader	Deputy Director, Monitoring and Examination Division, Radio Department, Telecommunications Bureau, Ministry of Posts and Telecommunications
Takahiro SASAKI	Project Coordinator	Grant Aid Project Management Department, Japan International Cooperation Agency (JICA)
Susumu TOYODA	Survey Leader Broadcasting plan	Chief Engineer, NHK Integrated Technology Inc.
Yasumasa KOKUBU	Transmitting facilities	ditto
Toru ENDO	Production facilities	ditto
Akira SHIRAI	Building plan	Chief Architect, NISSOKEN Architects/Engineers
Sadahiro SATO	Building facilities Cost estimation	Chief Engineer, NHK Integrated Technology Inc.

### (2) Explanation and Discussion on the Draft Final Report

<u>Name</u>	<u>Assignment</u>	<u>Present post</u>
Kiyoshi NORITAKE	Leader	Assistant Director, International Cooperation Division, Communication Policy Bureau, Ministry of Posts and Telecommunications
Kouichi SOMEI	Project Coordinator	Consultant Contract Division, Procurement Department, Japan International Cooperation Agency (JICA)
Susumu TOYODA	Survey Leader Broadcasting plan	Chief Engineer, NHK Integrated Technology Inc.
Yasumasa KOKUBU	Transmitting facilities	ditto
Akira SHIRAI	Building plan	Chief Architect, NISSOKEN Architects/Engineers



## 2. Survey Schedule



## 2. Survey Schedule

### (1) Basic Design Study

Date	Movement	Activities
April 16 Tue	Arrive at Bangkok	
17 Wed		- Exchange of views on Transmitting conditions with officials of the Lao PDR and Thailand
18 Thu	Arrive at Vientiane	
19 Fri		- Meeting with the Embassy of Japan - Courtesy call to Ministry of Information & Culture - Discussion on Inception Report - Observation of Lao TV Station
20 Sat		- Internal Meeting
21 Sun		- Discussion on Request
22 Mon		- Discussion on Project
23 Tue		- Preparation of Draft on Minutes of Discussions
24 Wed		- Signing of Minutes of Discussions - Report to the Embassy of Japan
25 Thu		(Officials leave Vientiane)
April 26 Fri		- Supplementary study by Consultant
to		• Study on building
		* Survey of new studio site
		* Discussion on building
		• Study on transmitting facilities
		* Survey of tower and TX house
		* Measurement of present field intensity
May 5 Sun		* Discussion on transmitting condition
		• Study on studio facilities
		* Survey of existing equipment
		* Discussion on studio facilities and system
May 6 Mon		- Finalization of discussion
7 Tue	Leave Vientiane	- Report to Embassy of Japan
May 7 Tue	Arrive at Bangkok	- Collecting data
8 Wed		- Meeting with PTD - Collecting data relating to building construction
9 Thu	Leave Bangkok	

(2) Explanation and Discussion on Draft Final Report

Date	Movement	Activities
Sept. 4 Wed	Arrive at Bangkok	
5 Thu		- Exchange of views on Transmitting conditions with the JICA Expert - Collecting data relating building equipment
6 Fri	Arrive at Vientiane	
7 Sat		- Meeting with Lao TV on schedule of explanation and discussion
8 Sun		- Internal meeting
9 Mon		- Meeting with the Embassy of Japan - Courtesy call to Ministry of Information & Culture
10 Tue		- Explanation and discussions on D/F report - Explanation of transmitting conditions to Ministry of Communications, Transport, Posts and Construction
11 Wed		- Explanation and discussions on D/F report - Preparation of Draft on Minutes of Discussions
12 Thu		- Signing of Minutes of Discussions - Report to the Embassy of Japan
13 Fri	Leave Vientiane Arrive at Bangkok	
14 Sat		- Collecting data
15 Sun		- Internal meeting (Mr. Shirai leaves Bangkok.)
16 Mon		- Explanation of transmitting conditions to PTD, PRD and representatives of television stations in Thailand - Report to JICA Thailand Office
17 Tue	Leave Bangkok Arrive at Tokyo	



### 3. List of Interviewees



### 3. List of Interviewees

#### (1) The Lao People's Democratic Republic

- Ministry of Information & Culture
  - Minister ..... Mr. Mounkeo ORABOUN
  - Vice Minister ..... Mr. Bounteng VONGSAY
  - Director, Planning, Economy ..... Mr. Xoun KEOMANY  
and Finance Department
  - Deputy Director, Planning, ..... Mr. Phady SOULIVONG  
Economy and Finance Department
  
- Lao National Radio and Television
  - Deputy Director General ..... Dr. Kheckeo SOISAYA
  - Technical Managing Director ..... Mr. Dy SISOMBATH
  
- Lao National TV Station
  - Acting Director General, ..... Mr. Phoumy PHENGSAVAT  
Technical Department
  - Deputy Director, ..... Mr. Khoun SOUNANTHA  
Administration Department
  - Deputy Director (T.V. Producer), .... Mr. Pineprathana PHANTHAMALY  
Production Department
  - Deputy Director (Announcer), ..... Mrs. Phouangnalay PHONGPHAVANH  
Production Department
  - Cameraman and Reporter, ..... Mr. Bounlap DOUANGPHOUMY  
EFP Team, Production Department
  - Assistant Engineer, ..... Mr. Phoui THAMALAT  
Technical Department
  
- Lao National Radio Station
  - Deputy Technical Director ..... Mr. Nikone ANOUVONG
  
- Ministry of Communications, Transport, Posts and Construction
  - Assistant Director ..... Mr. Snith XAPHAKDY

- |  |                              |
|--|------------------------------|
| Vice Director, .....<br>Enterprise Des Postes<br>Telecommunications  | Mr. Pho PHATHAPHONE          |
| Urban Planner, .....<br>Construction Division  | Mr. Linseng DOUANESAVANH     |
| Director, Enterprise for Survey .....<br>and Construction Material<br>Laboratory,<br>Construction Division | Mr. Ngeun SIVISAY            |
| Director, State Building .....<br>Construction Company No. 5   | Mr. Souvanthong LUANGSOUPHON |
| Deputy General Manager, .....<br>Nam Papa Lao<br>(Lao Water Board)   | Mr. Somlith SILAPHET         |
| Chief of Distribution, .....<br>Nam Papa Lao   | Mr. Oth KEOMANIVONG          |
| • Ministry of Planning, Economy & Finance  |                              |
| Department of Investment .....   | Mr. Vilaysack PHOTHICHANH    |
| • Ministry of Agriculture-Forestry   |                              |
| Director, Meteorology and .....<br>Hydrology Department  | Mr. Kounh SENGDARA           |
| Vice Director, Meteorology and .....<br>Hydrology Department   | Mr. Vongdara KEOMUONGCHANH   |
| Director, Irrigation Department .....  | Mr. Langsy SAYVISITH         |
| Director, Institute of Irrigation .....<br>and Microhydropower   | Mr. Vankham THAMMACHAK       |
| Chief Surveyor, Institute of .....<br>Irrigation and Microhydropower                                       | Mr. Souvanh THAMMAVONGSA     |
| • Ministry of Industry and Handicraft  |                              |
| Director, Project Department, .....<br>Electricite Du Laos<br>(EDL; State Electricity Company)             | Mr. Viraphonh VIRAVONG       |
| Engineer, Project Department, .....<br>EDL   | Mr. Voradeth PHONEKEO        |
| Vice Director, Electrical .....<br>Construction and<br>Installation Co., (ECI)                             | Mr. Anphone PHOMMACHANH      |

General Manager, ECI .....	Mr. Sommano PHOLSENA
Manager (Electrical Engineer), ..... Technical Department, ECI	Mr. Vilaysone SOURIGNA
Manager, Supply and Trading ..... Division, Lao State Fuel Company	Mr. Sisouvanh SILIVONG
Director, Geo-Mining Enterprise .....	Mr. Saykham KEOMOUNGKHOUNE
• Ministry of Commerce and Tourism	
Deputy General Director, ..... Lao State Material Company	Mr. SIPASEUTH
• Vientiane Municipality	
Director, Survey and Design ..... State Company	Mr. Vath PHOTIMATH
• Consultant	
Managing Director, SK Consultant ..	Mr. Sengkham PHINITH
Finance Director, Lao Survey and ... Exploration Services Co., Ltd. (LSES)	Mr. Harold CHRISTENSEN
Technical Adviser, LSES .....	Mr. Panh PHOMSOMBATH
• Embassy of Japan	
Ambassador Extraordinary and Plenipotentiary .....	Mr. Shigemi ANDO
Councilor .....	Mr. Yukuto MURATA
First Secretary .....	Mr. Shinji NAGASHIMA
Second Secretary .....	Mr. Hirofumi TANIGUCHI
• JOVC Vientiane Office .....	Mr. Mizuo INAGUCHI

(2) Thailand

- Post and Telegraph Department (PTD), Ministry of Communication
  - Deputy Director General ..... Mr. Sethaporn CUSRIPITUCK
  - Director, International Services ..... Ms. Somchit Chularat M. A.  
Division
  - International Services Division ..... Mr. Saksith SASIBUTRA
  - International Services Division ..... Ms. Apinya BUETCHARATAN
  - Director, Officer of Frequency ..... Mr. Rianchai REOWILAISUK  
Management
  - Telecommunication Engineer, ..... Mr. Thanoo SAWETSRITHAWAN  
Office of Frequency Management
  - Office of Frequency Management .... Mr. Punya TEERASAKSIL
  - Planning Division ..... Mr. Pipqpe CHOOSNOHARQEN
  - Office of Radio Frequency ..... Mr. Pomya TEERASAIL  
Management
  - JICA Expert ..... Mr. Minoru TAKAHARA
  
- Embassy of The Lao PDR
  - Second Secretary ..... Mr. Khamsene PHONGSA
  - Third Secretary ..... Mr. Phouttha KHAMPHAVONG
  
- Embassy of Japan
  - First Secretary ..... Mr. Yoshihiro CHIBA
  
- JICA Thailand Office
  - Resident Representative ..... Mr. Nobuji ABE
  - Deputy Director ..... Mr. Keiichi KATO
  - Assistant Resident Representative ... Mr. Tetsuya MIWA  
Mr. Tokuhisa ISHIWATA

#### 4. Minutes of Discussions





4. Minutes of Discussions

**MINUTES OF DISCUSSIONS**  
**BASIC DESIGN STUDY ON THE PROJECT FOR**  
**CONSTRUCTION OF STUDIO AND REPLACEMENT OF EQUIPMENT**  
**FOR**  
**LAO NATIONAL TV STATION**  
**IN**  
**THE LAO PEOPLE'S DEMOCRATIC REPUBLIC**

Based on the results of the Preliminary Study, the Japan International Cooperation Agency (JICA) decided to conduct a Basic Design Study on the Project for Construction of Studio and Replacement of Equipment for Lao National TV Station (hereinafter referred to as the "Project").

JICA sent to the Lao PDR the study team, which is headed by Mr. Koichi Sazanami, Deputy Director, Monitoring and Examination Division, Radio Department, Telecommunications Bureau, Ministry of Posts and Telecommunications, and is scheduled to stay in the country from April 18th to May 7th, 1991.

The team held discussions with the officials concerned of the Government of the Lao PDR, and conducted a field survey at the study area.

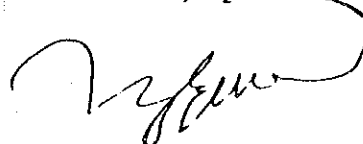
In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study Report.

Vientiane, April 24th, 1991

佐々木波浩

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Mr. Koichi Sazanami  
Leader  
Basic Design Study Team  
JICA



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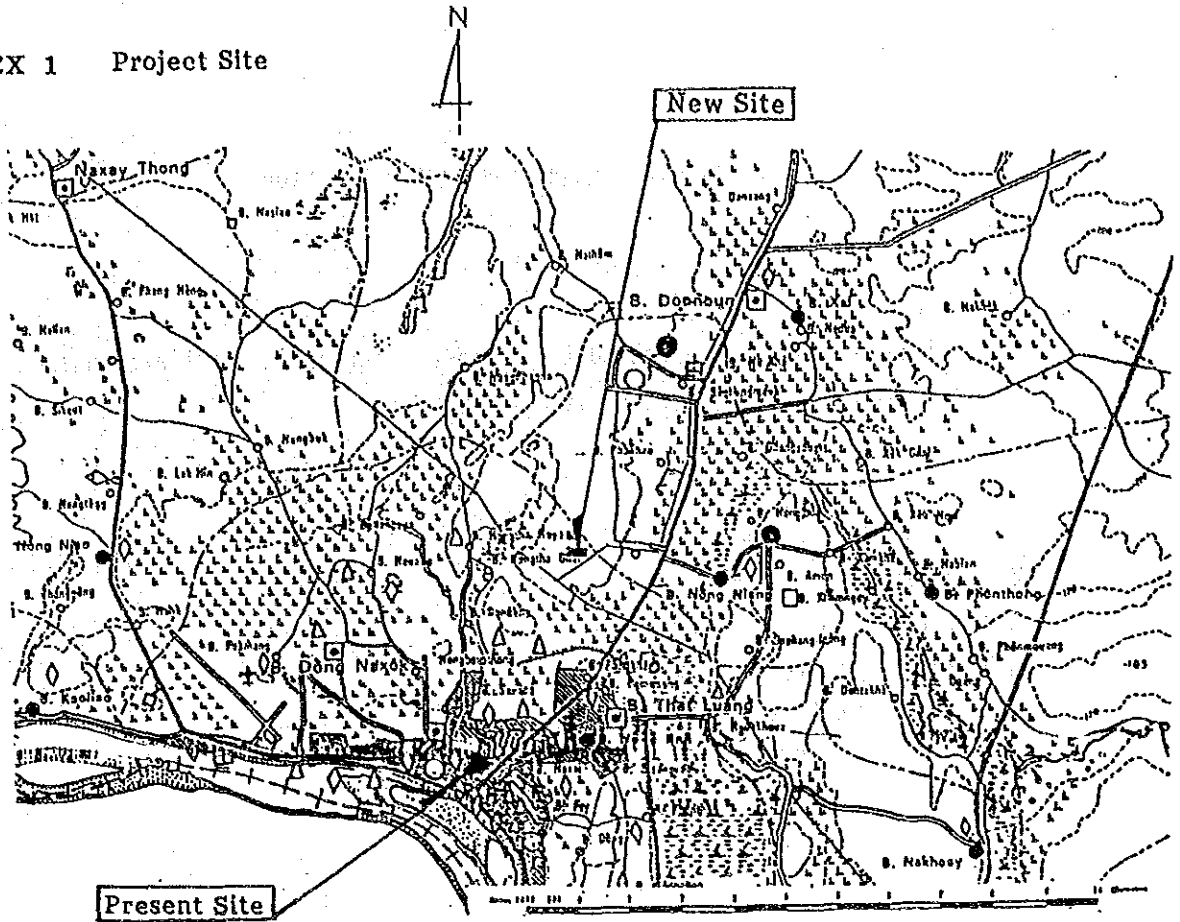
Dr. Kheckeo Soisaya  
Deputy Director General  
Lao National Radio and Television

## ATTACHMENT

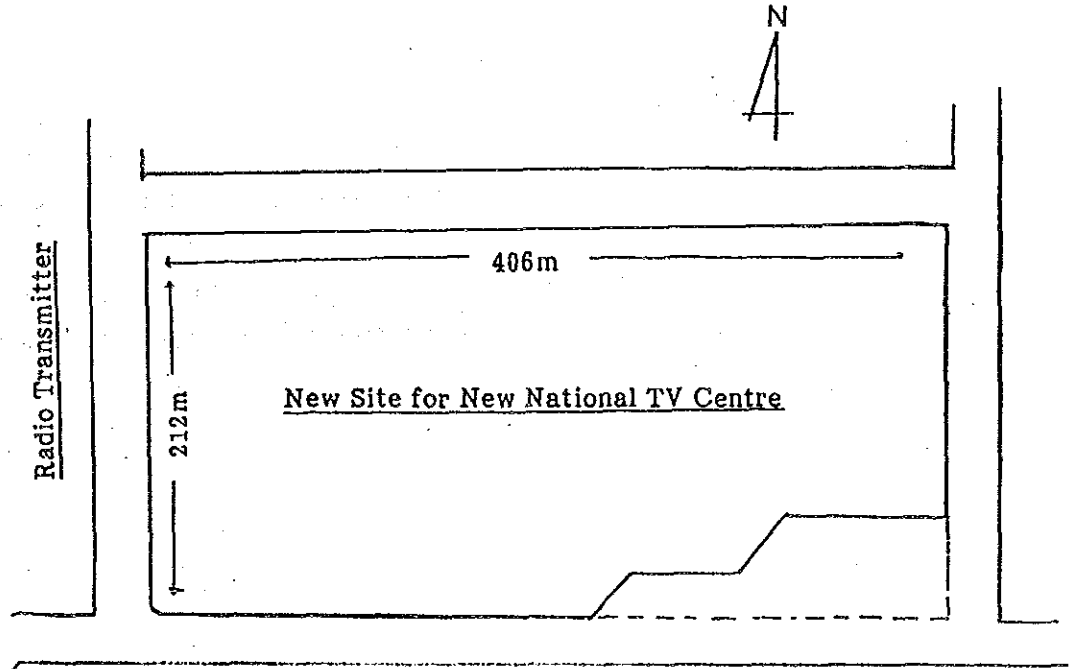
1. Objective  
The objective of the Project is to upgrade television broadcasting facilities for Lao National Television Station in Vientiane.
2. Project Site  
Vientiane City Area shown in ANNEX 1
3. Executing Agency  
The Director General of the Lao National Radio and Television is responsible for the execution and administration of the Project under the supervision of the Ministry of Information and Culture.
4. Items requested by the Government of the Lao PDR  
After discussions with the Radio Design Study team, the items requested by the Lao side were listed in ANNEX 2.  
  
The Government of the Lao PDR stated that the Lao side would hold further discussions and have an understanding with Thailand on the transmitting conditions of Lao TV Station in Vientiane listed in ANNEX 3.
5. Japan's Grant Aid system
  - (1) The Government of the Lao PDR has understood the system of Japanese Grant Aid explained by the team.
  - (2) The Government of the Lao PDR will take the necessary measures, described in ANNEX 4 for smooth implementation of the Project, on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.
6. Schedule of the study
  - (1) The consultants will proceed to further studies in the Lao PDR until May 7th, 1991.
  - (2) JICA will prepare the draft report in English, and will dispatch a mission in order to explain its contents after it is confirmed that the Lao side has finished a consultation with Thailand and obtained its understanding on the transmitting conditions as described in the above item 4.
  - (3) In case that the contents of the report is accepted in principle by the Government of the Lao PDR, JICA will complete the final report and send it to the Government of the Lao PDR.

The tentative schedule of the study is show in ANNEX 5.

ANNEX 1 Project Site



SITE MAP



SITE PLAN

*Ref*

5

ANNEX 2

List of Items Requested by the Lao Side

1. Facilities

A building necessary for accomodating broadcasting equipment listed below except item 2.1 Transmitter and item 2.6 OB Van.

2. Broadcasting Equipment

2.1 Transmitter	1 set
2.2 Production Studio Equipment	1 set
2.3 Master Control Equipment	1 set
2.4 Programme Editing Equipment	1 set
2.5 Equipment for Dubbing	1 set
2.6 OB Van	1 set
2.7 ENG Equipment	1 set
2.8 Electronic Measurement Equipment	1 set
2.9 Spare Parts	1 set

3. Technical Cooperation

The Government of the Lao PDR requested the following technical cooperation for smooth and effective operation and maintenance of the Equipment and the Facilities:

- (1) To dispatch the Japanese expert(s)/volunteer(s) to the Lao National TV
- (2) To invite the staff(s) of the Lao National TV to Japan for traning

**ANNEX 3**

**Transmitting Conditions of Lao TV Station in Vientiane**

1. **Transmitter Output Power : 5 Kw**
2. **Location of Antenna : Same as the existing**
3. **Antenna Height : Same as the existing**

*Zipu*

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ANNEX 4

1. To ensure the facilities site including water and electricity supply.
2. To ensure prompt unloading, tax exemption, customs clearance at ports of disembarkation and prompt internal transportation of the equipment purchased under the Grant Aid.
3. To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
  - 3-1 Advising commission of authorization to pay (about ¥3,000 for each authorization to pay).
  - 3-2 Payment commission (about 0.1% of each payment).
4. To exempt Japanese Nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Lao PDR with respect to the supply of the products and services under the Verified Contracts.
5. To accord Japanese Nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into the Lao PDR and stay therein for the performance of their works.
6. To bear all the expenses other than those to be born by the Grant, necessary for the execution of the Project.
7. To ensure the proper and effective operation and maintenance of equipment purchased under the Grant.



ANNEX 5

Study Schedule (tentative)

The overall process of the Basic Design Study is shown below.

	APR	MAY	JUN	JUL	AUG	SEP	OCT
Preparation of the study in Japan	▬						
Field survey in the Lao PDR	▬▬						
Preparation of draft report		▬					
Explanation of draft report in the Lao PDR					▬		
Preparation and submission of final report						▬ ▼	

S

*Handwritten signature*





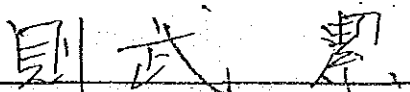
**MINUTES OF DISCUSSIONS**  
**BASIC DESIGN STUDY ON**  
**THE PROJECT FOR**  
**CONSTRUCTION OF STUDIO AND REPLACEMENT OF EQUIPMENT**  
**FOR LAO NATIONAL TV STATION**  
**IN**  
**THE LAO PEOPLE'S DEMOCRATIC REPUBLIC**  
**(CONSULTATION ON DRAFT REPORT)**

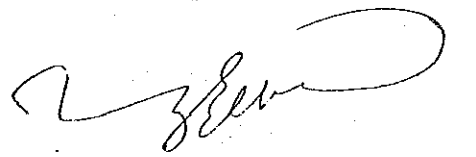
In April 1991, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on the Project for Construction of Studio and Replacement of Equipment for Lao National TV Station (hereinafter referred to as "the Project") to the Lao People's Democratic Republic, and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

In order to explain and to consult the Lao People's Democratic Republic on the components of the draft report, JICA sent to the Lao People's Democratic Republic a study team which is headed by Mr. Kiyoshi Noritake, Assistant Director, International Cooperation Division, Communication Policy Bureau, Ministry of Posts and Telecommunications, and is scheduled to stay in the country from 6th September to 13th September, 1991.

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

Vientiane, September 12th, 1991

  
Mr. Kiyoshi Noritake  
Leader  
Draft Report Explanation Team  
JICA

  
Dr. Kheckeo Solsaya  
Deputy Director General  
Lao National Radio and Television

Annex: Necessary measures to be taken by the Government of the Lao People's Democratic Republic in case Japan's Grant Aid is executed.

1. To secure the site for the Project.
2. To clear, level and reclaim the site prior to commencement of the construction.
3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site prior to commencement of the construction.
5. To provide facilities for distribution of electricity, water supply, telephone, drainage, sewage and other incidental facilities to the Project site.
  - 1) Electricity distributing line to the site.
  - 2) City water distribution main to the site.
  - 3) Drainage city main to the site.
  - 4) Telephone trunk line to the main distribution panel of building.
  - 5) General furniture such as carpets, curtains, tables, chairs and others.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
7. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
8. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into the Lao People's Democratic Republic and stay therein for the performance of their work.
9. To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.
10. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

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## ATTACHMENT

### 1. Components of draft report

The Government of the Lao People's Democratic Republic has agreed and accepted in principle the components of the draft report proposed by the Team.

### 2. Japan's Grant Aid system

(1) The Government of the Lao People's Democratic Republic has understood the system of Japanese Grant Aid explained by the Team.

(2) The government of the Lao People's Democratic Republic will take the necessary measures, described in Annex, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

### 3. Further schedule

The team will make the final report in accordance with the confirmed items, and send it to the Government of the Lao People's Democratic Republic by the end of October 1991.

### 4. Technical cooperation in connection with the Project

(1) The Lao side pointed out the need for dispatch of Japanese experts as well as technical training of counterpart personnel in Japan.

They also understood that technical cooperation cannot be requested in the Grant Aid system and that another official request should be submitted through diplomatic channels.

(2) The study team explained the Japanese technical cooperation system and pointed out that a new proposal of the Government of the Lao People's Democratic Republic would be necessary, when such cooperation is needed in connection with the Project.

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5. Transmitting conditions

The Government of the Lao People's Democratic Republic stated that the Lao side got an understanding with Thailand on the new transmitting conditions of Lao TV Station in Vientiane using Ch-9 as described in the Basic Design Study Report.

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## 5. List of Materials Collected



## 5. List of Materials Collected

### (1) Laws and Regulations by Ministries concerned

- 1) Regarding registration of construction companies
- 2) Regarding registration of consultants
- 3) Regarding tendering procedures

### (2) Labour Laws

### (3) Basic Statistical Data

### (4) Statistics on Prices of Commodities

### (5) Meteorological Data in Vientiane

(recorded by Ministry of Agriculture-Forestry for the past 20 years)

- 1) Average monthly temperature
- 2) Maximum and minimum monthly temperatures on average
- 3) Maximum and minimum temperatures in each month
- 4) Monthly rainfall and average monthly rainfall
- 5) Average monthly relative humidity
- 6) Monthly hours of Sunshine
- 7) Average monthly wind velocity
- 8) Maximum monthly wind velocity

### (6) Map

- 1) Map of Vientiane city (1/100,000)
- 2) Map of Vientiane city (1/10,000)
- 3) Map of the Lao PDR (1/1,000,000)

4) Map of northern part of Thailand

5) Map of proposed site

(7) Outline of Vientiane

(8) Charges for Utilities

1) Electricity charges (from ELL)

2) Water charges (from Nam Papa Lao)

3) Telephone and telex charges (from PTT)

4) Petroleum and gas charges (from National Fuel Company)



## 6. Reference Data Attached

6.1	Measurement Data of Field Intensity .....	23
6.2	Study on Interference .....	31
6.3	Existing Studio Equipment of Lao National Television .....	37
6.4	Boring Data .....	41
6.5	Temperature, Humidity and Rainfall in Vientiane for the Past Twenty Years (1971 to 1990) .....	49



## 6.1 Measurement Data of Field Intensity

- (1) The measurement of field intensity was conducted, with reference to the following frequencies.

Ch-No	$f_v$	$f_a$
E- 5	175.25	180.75
6	182.25	187.75
7	189.25	194.75
8	196.25	201.75
9	203.25	208.75
10	210.25	215.75
11	217.25	222.75
12	224.25	229.75

The measuring instrument used was model ML521B manufactured by Anritsu.

- (2) Measuring points were shown in Fig. 6-1-1.

On 27 April 1991,	Northeast direction,	NE-1 ~ NE-10
On 29 April 1991,	North direction,	N-1 ~ N-11
On 30 April 1991,	West direction,	W-1 ~ W-4
On 4 May 1991,	Southeast direction,	SE-1 ~ SE-8

(3) Measuring Data

- 1) Table 6-1-1 shows present field strength and picture quality. Anticipated field intensities under the new transmission conditions based on CCIR propagation curve and in addition on topographical compensation at some points where required are shown in the column of "Expected fv". D/U ratios are calculated on the basis of values drawn from the above.
- 2) Table 6-1-2 shows measured field intensities of TV stations other than Vientiane Station.

Ch-5	Thailand	Sakhon Nakhon	17°10' N,	104°09' E
Ch-6+	ditto	Nong Khai	17°44'30" N,	102°46'15" E
Ch-7+	ditto	Sakhon Nakhon	17°08'21" N,	103°59'39" E
Ch-8-	ditto	Loei	17°32' N,	101°42' E
Ch-9+	ditto	Sakhon Nakhon	17°08'21" N,	103°59'39" E
Ch-10	ditto	Udon Thani	17°38'58" N,	102°47'27" E
Ch-11	ditto	Sakhon Nakhon	17°10' N,	104°09' E
Ch-12	ditto	Udon Thani	17°13'46" N,	102°29'14" E

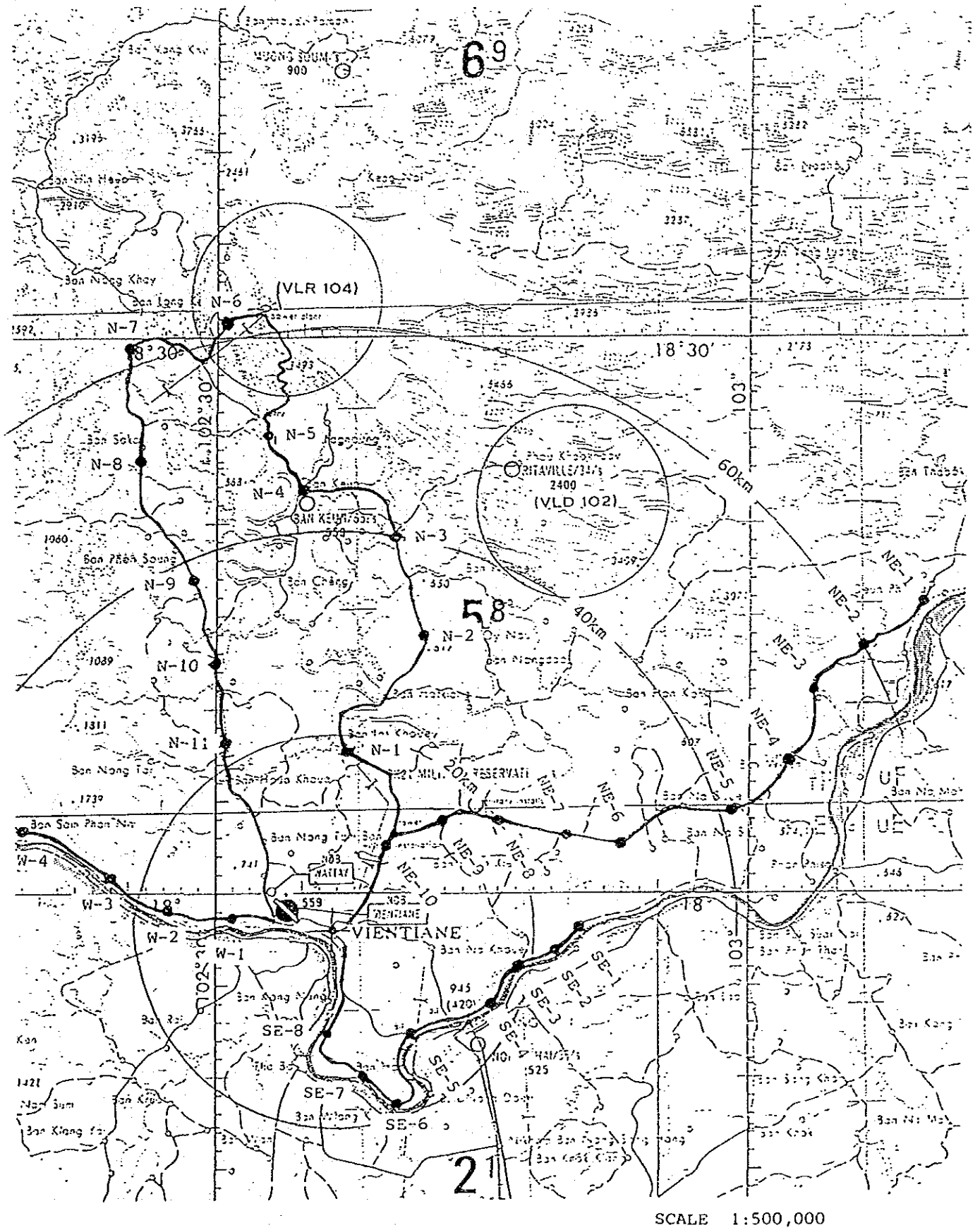


Fig. 6-1-1 Measuring Points of Field Intensity

Table 6-1-1 Measurement Results of Field Intensity of Vientiane Station (1/2)

Location	Deg.	km	Measured		Note *	Expected
			<i>f<sub>v</sub></i>	<i>f<sub>a</sub></i>		<i>f<sub>v</sub></i>
NE-1 Thoay-Noy	60	72	34	27	S-2, I-3	46
NE-2 Houailaokha	61	60	40	32		50
NE-3 Hai	66	53	43	35		53
NE-4 Phao	69	48	39	28	S-3, I-3	55
NE-5 Naxon	73	41	44	37		59
NE-6 Laksamsip-Hok	74	30	53	44		65
NE-7 Laksamsip-Et	67	25	63	50		70
NE-8 Nonhinhe	57	20	62	54		76
NE-9 Laksippet	45	16	70	63		81
NE-10 Donnoun	35	10	79	71		89
SE-1 Simmano	90	25	52	49		67
SE-2 Khoaydeng	96	22	66	50		70
SE-3 Thapha	100	19	62	50	S-4, I-3	72
SE-4 Thadua	119	17	61	50		68
SE-5 Nong-Heo	141	13	75	67		74
SE-6 Thakkek	161	19	64	60		61
SE-7 Thinphia	164	16	75	62		63
SE-8 Kenggnang	179	10	76	65		73

\* : S; Signal strength, I; Co-channel interference with Loei Station  
 (Receiving antenna for home use; 29 elements, height; about 10m)  
 Expected *f<sub>v</sub>* : Anticipated visual field intensity under new transmission conditions  
 (based on CCIR Rec. 370-4 Figure 1)

Table 6-1-1 Measurement Results of Field Intensity of Vientiane Station (2/2)

Location	Deg.	km	Measured		Note *	Expected
			fv	fa		fv
N-1 Thangon	6	19	67	59	S-3, I-3	77
N-2 Thongmang	20	30	45	34		66
N-3 Napheng	12	40	48	40	S-3, I-2	60
N-4 Keun	358	44	40	29		58
N-5 Pakkagnong	354	50	43	34		54
N-6 Thinkeo	349	62	32	24		47
N-7 Phonhong	343	62	35	26	S-2, I-1	47
N-8 Nabon	340	50	40	29		54
N-9 Nadi	340	38	41	32		60
N-10 Phonmouang	338	30	54	50		66
N-11 Ilai	332	22	60	55		74
W-1 Nongda	275	10	77	65		86
W-2 Houihom	276	17	65	65	S-4, I-3	75
W-3 Ang	283	23	37	36	Shadow	44
W-4 Sounphana	287	32	29	22	S-2, I-2 Shadow	38

\* Signal strength (S) and interference (I) are evaluated by internationally practised SINPO code as shown below.

SINPO Code

Rank	S	I	N	P	O
	Signal strength	Interference (QRM)	Noise (QRN)	Propagation	Overall
5	Excellent	Imperceptible	Imperceptible	Imperceptible	Excellent
4	Good	Perceptible but not annoying	Perceptible but not annoying	Perceptible but not annoying	Good
3	Fair	Slightly annoying	Slightly annoying	Slightly annoying	Fair
2	Poor	Annoying	Annoying	Annoying	Poor
1	Bad	Very annoying	Very annoying	Very annoying	Bad

Table 6-1-2 Measurement Results of Potential Field Intensity,  $f_v(1/2)$

Location	Deg.	km	Ch-5	Ch-6	Ch-7	Ch-8	Ch-9	Ch-10	Ch-11	Ch-12
NE-1 Thoay-Noy	60	72								
NE-2 Houailaokha	61	60	32	44	24	25	25	35	—	32
NE-3 Hai	66	53								
NE-4 Phao	69	48								
NE-5 Naxon	73	41								
NE-6 Laksamsip-Hok	74	30	42	74	—	31	26	62	—	45
NE-7 Laksamsip-Et	67	25								
NE-8 Nonhinhe	57	20								
NE-9 Laksippet	45	16								
NE-10 Donnoun	35	10								
SE-1 Simmano	90	25	37	86	—	47	25	57	—	44
SE-2 Khoaydeng	96	22								
SE-3 Thapha	100	19								
SE-4 Thadua	119	17								
SE-5 Nong-Heo	141	13								
SE-6 Thakkek	161	19	35	72	—	58	24	74	—	62
SE-7 Thinphia	164	16								
SE-8 Kenggnang	179	10								



Table 6-1-2 Measurement Results of Potential Field Intensity,  $f_v$  (2/2)

Location	Deg.	km	Ch-5	Ch-6	Ch-7	Ch-8	Ch-9	Ch-10	Ch-11	Ch-12
N-1 Thangon	6	19								
N-2 Thongmang	20	30								
N-3 Napheng	12	40	—	—	—	—	—	49	—	—
N-4 Keun	358	44								
N-5 Pakkagnong	354	50								
N-6 Thinkeo	349	62								
N-7 Phonhong	343	62	—	—	—	33	11	41	—	29
N-8 Nabon	340	50								
N-9 Nadi	340	38								
N-10 Phonmouang	338	30								
N-11 Ilai	332	22	—	—	—	43	—	—	—	32
W-1 Nongda	275	10								
W-2 Houihom	276	17	—	—	—	40	17	55	—	—
W-3 Ang	283	23								
W-4 Sounphana	287	32	—	—	—	32	12	40	—	—
○ Vientiane			42	61	27	58	20	65	29	62



## 6.2 Study on Interference

### (1) D/U Ratio

CCIR stipulates the D/U ratio of the 625-line PAL TV system as below. \*Note 1)

In case of co-channel, $8/12 f_H$ ordinary off-set *Note 2);	D/U ratio, 30dB
In case of adjacent lower channel;	D/U ratio, -6dB
In case of adjacent higher channel;	D/U ratio, -12dB

The D/U ratio means the ratio of desirable to undesirable field strengths at a receiver input. That is, in case of there being a co-channel, it is indicated that if a desirable wave input is stronger than undesirable one by 30dB (31.6 times), the received picture quality is considered practically quite acceptable. In the case of adjacent channels, if a desirable wave is stronger by more than half (-6dB) or a quarter (-12dB), interference is unnoticeable.

### (2) Merit by Receiving Antenna

When a receiving antenna is properly oriented to a correct direction, an input signal of a selected channel to a receiver becomes stronger and accordingly the D/U ratio against interfering waves coming from other directions becomes higher. It is noticed that most of the receiving antennas used in the border area between the Lao PDR and Thailand are highly directional ones with 29-elements. Due to this fact, the D/U ratio is much improved.

Such a receiving antenna has a directivity as shown below, and the examination on D/U ratio is conducted on the basis of those characteristics.

Directional angle	0°	10°	20°	30°	40°	more than 50°
Improvement in D/U ratio	0dB	1.7dB	5dB	12dB	20dB	23dB

\*Note 1): CCIR REPORT 306-4, RECOMMENDATION 418-3

\*Note 2): In case of  $8/12 f_H$  ordinary off-set, visual carrier (203.25MHz in CH-9) is shifted to higher or lower frequency by  $8/12$  of horizontal scanning frequency (15.625kHz in the 625-line TV system), by which interference problem is reduced. In this Project, the propagation wave which may cause interference is the CH-9 +  $8/12 f_H$  off-set frequency.

(3) Examination on Interference

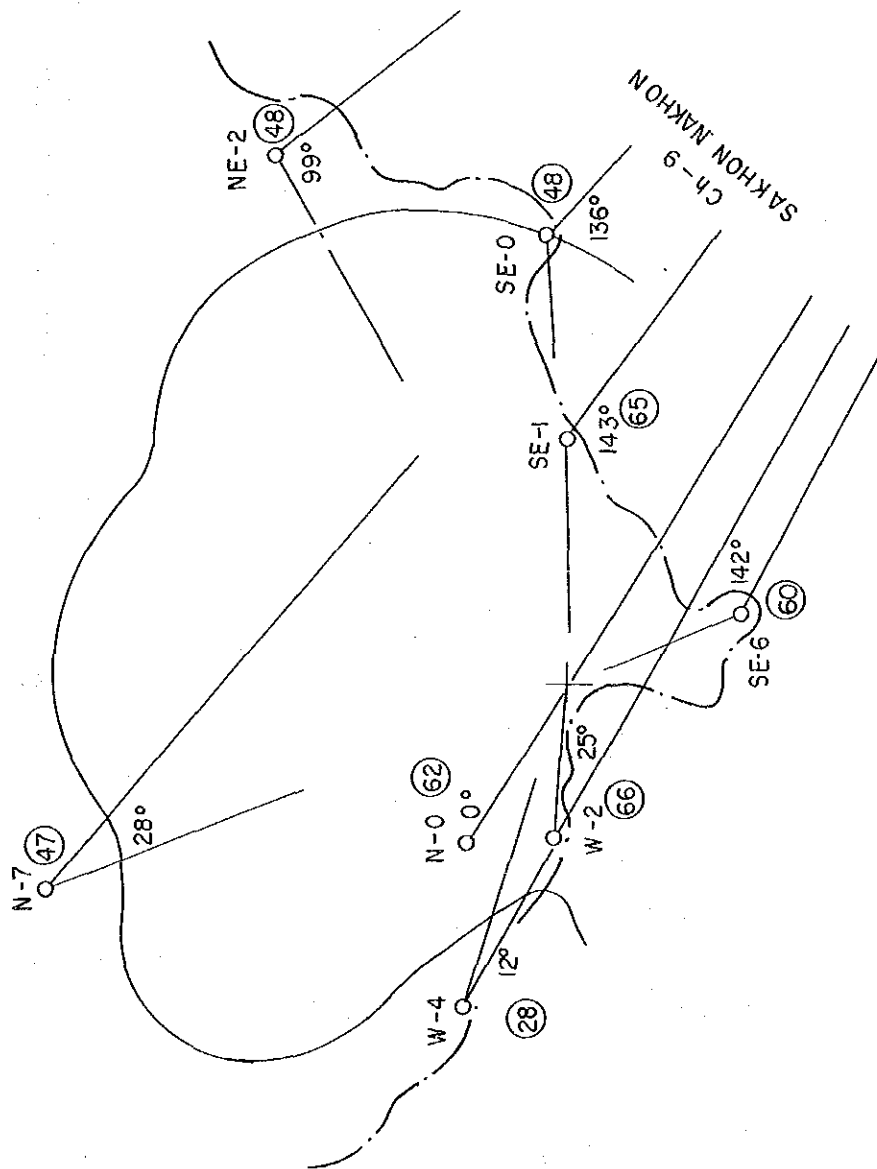
D/U ratio is calculated with the following equation at places in and around the service area located in the same direction as that to desired and undesired stations, or that are influenced by the strong field intensity of interference waves.

(These places have comparatively bad receiving conditions.)

$$\frac{\text{Field intensity of desired channel} - \text{Field intensity of undesired channel}}{\text{Improvement ratio by receiving antenna}} = \text{D/U ratio}$$

The results of calculations are shown in Fig. 6-2-1, Fig. 6-2-2 and Fig. 6-2-3, indicating that D/U ratios with sufficient marginal value are obtained in the overall service areas.

In Fig. 6-2-1, however, the point W-4 is located in shadow of mountains and therefore the field intensity of the desired station is so weak that co-channel interference may inevitably occur.

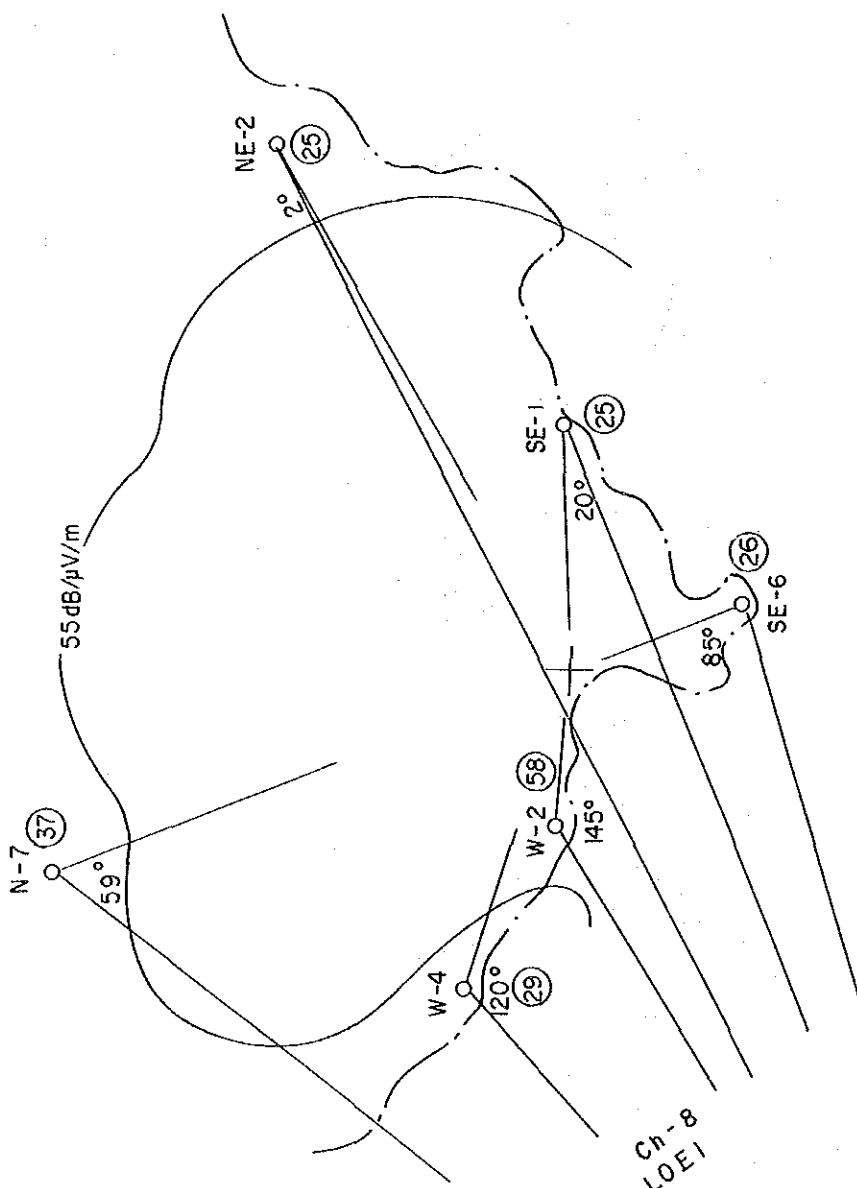


Estimated D/U Ratio

	D	U	Deg	Merit	D/U
N-7	47	11	28°	11	47
NE-2	50	25	99°	23	48
SE-1	67	25	143°	23	65
SE-6	61	24	142°	23	60
W-2	75	17	25°	8	66
W-4	38	12	12°	2	28
N-0	77	15*	0°	0	62
SE-0	55	30*	136°	23	48

Note: Unit in dB  
 Deg: Desired Station  
        Undesired Station  
 Merit: Merit of Receiving Antenna  
 D/U = D - U + Merit  
 (Allowable D/U > 30 dB)  
 \*: Estimated Value

Fig. 6-2-1 Study on Co-channel Interference

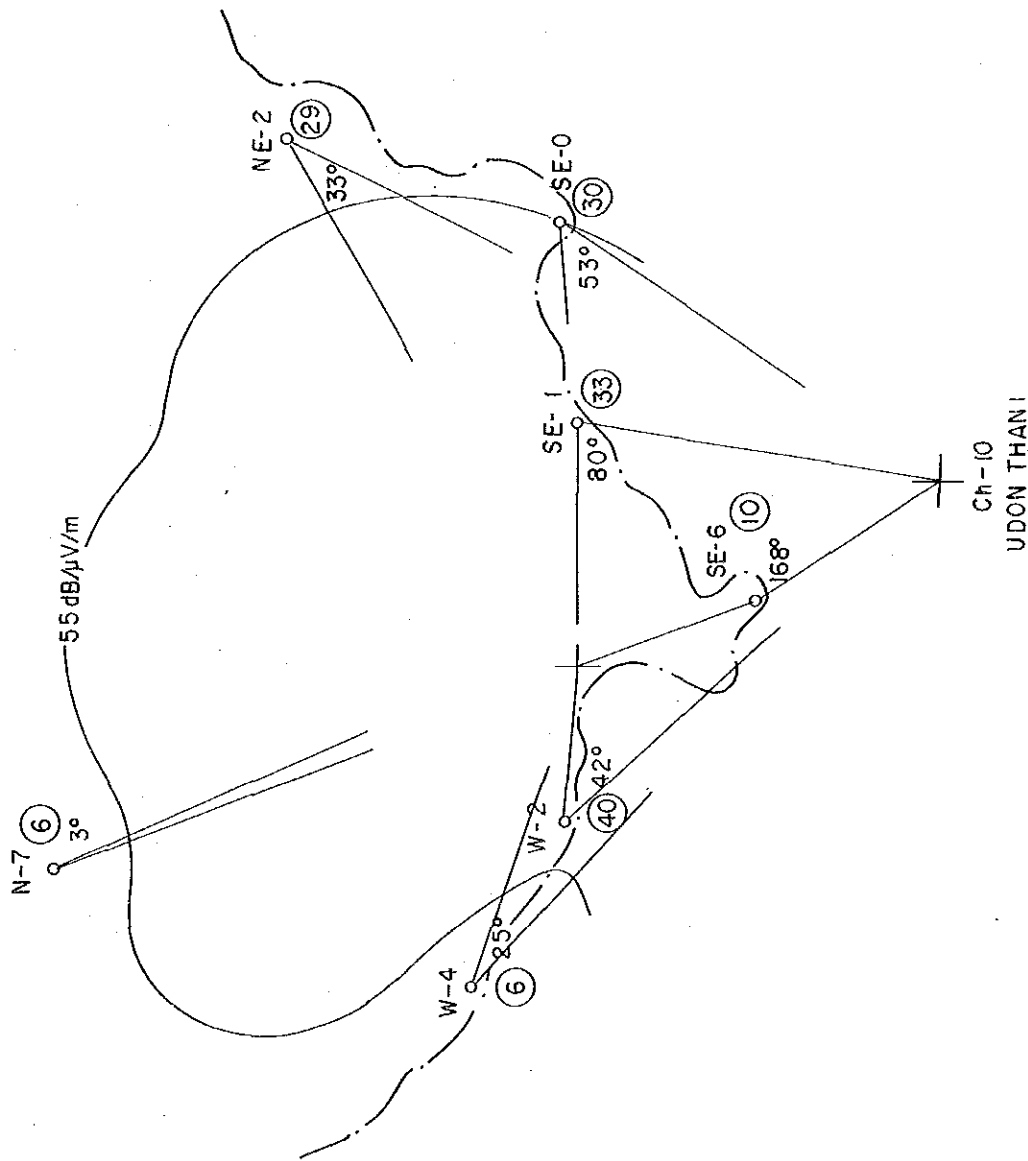


Estimated D/U Ratio

	D	U	Deg	Merit	D/U
N-7	47	33	59°	23	37
NE-2	50	25	2°	0	25
SE-1	67	47	20°	5	25
SE-6	61	58	85°	23	26
W-2	75	40	145°	23	58
W-4	38	32	120°	23	29

Note: Unit in dB  
 Deg: Desired Station  
        Undesired Station  
 Merit: Merit of Receiving Antenna  
 D/U = D - U + Merit  
 (Allowable D/U > -6 dB)

Fig. 6-2-2 Study on Lower Adjacent Channel Interference



Estimated D/U Ratio

	D	U	Deg	Merit	D/U
N-7	47	41	3°	0	6
NE-2	50	35	33°	14	29
SE-1	67	57	80°	23	33
SE-6	61	74	168°	23	10
W-2	75	55	42°	20	40
W-4	38	40	25°	8	6
SE-0	55	48*	53°	23	30

Note: Unit in dB  
 Deg: Desired Station  
 Undesired Station  
 Merit: Merit of Receiving Antenna  
 $D/U = D - U + \text{Merit}$   
 (Allowable  $D/U > -12 \text{ dB}$ )  
 \*: Estimated Value

Fig. 6-2-3 Study on Upper Adjacent Channel Interference





## 6.3 Existing Studio Equipment of Lao National Television

### 1. Production Studio

#### 1.1 Studio

(1)	TV Receiver	NEC 20T775MH	1 set
(2)	Video Camera	DXC 1820P	1 set
(3)	Video Camera	DXC 3000P	1 set
(4)	Microphone	F115	2 sets
(5)	Desk Stand	A20	2 sets
(6)	Camera Cable	CCQ-25	1 pce
(7)	Camera Cable	CCQ-50	1 pce

#### 1.2 Control Room

(1)	Video Cassette Recorder	VO 9600	1 set
(2)	Camera Adaptor	CMA 8CE	2 sets
(3)	Camera Control Unit	CCU 1820	2 sets
(4)	Special Effects Generator	SEG 2000AP	1 set
(5)	Wipe Pattern	WEX 2000P	1 set
(6)	Universal Chromakey	CRK 2000	1 set
(7)	Colour Monitor	CVM 1370QE	1 set
(8)	Audio Mixer	MXP 210	1 set
(9)	Betamax Video Cassette Recorder	VTC 9400P	1 set
(10)	Colour Monitor	JVC TM 150 PSN	1 set
(11)	Waveform Monitor	TEK 528	1 set

## 2. Master Control Room

(1)	Video Cassette Recorder	VO 5630	1 set
(2)	Video Cassette Player	VO 5040	1 set
(3)	Video Cassette Recorder	VO 9600	1 set
(4)	Time Base Corrector	FA 310	1 set
(5)	V/A Selector	VCS 63A	1 set
(6)	BARCO Demodulator	VSD2X	1 set
(7)	Transcoder SECAM-PAL	CST 1000SP	1 set
(8)	Video Colour Monitor	CVM 1370QE	2 sets
(9)	Audio Mixer	MX510	1 set
(10)	TV Receiver	TV NEC 20T775MH	1 set
(11)	Modulator	THOMSON LGT	1 set

## 3. Editing Room A

(1)	Video Cassette Recorder	VO 5850	2 sets
(2)	Remote Control	RM450	1 set
(3)	Colour Video Monitor	PVM 9000ME	1 set
(4)	B/W Video Monitor	PVM 91CE	1 set

## 4. Editing Room B

(1)	Video Cassette Recorder	VO 5850	2 sets
(2)	Remote Control	RM450	1 set
(3)	Colour Video Monitor	CVM 1370QE	1 set
(4)	B/W Video Monitor	PVM 91CE	1 set

#### 5. Editing Room C

(1)	Video Cassette Recorder	VO 9850P	1 set
(2)	Video Cassette Recorder	VO 5850P	1 set
(3)	Video Monitor	JVC TM 150 PSN	1 set
(4)	Video Monitor	PVM 91CE	1 set
(5)	Remote Control	RM450	1 set

#### 6. Tape-Copy Room A

(1)	Video Cassette Recorder	VO 5850	1 set
(2)	Video Cassette Recorder	VO 9800	1 set
(3)	Time Base Corrector	FA300	1 set
(4)	Colour Monitor	PVM 9000ME	1 set
(5)	Colour Monitor	PVM 9020ME	1 set

#### 7. Tape-Copy Room B

(1)	Video Cassette Recorder	VO 5630	1 set
(2)	TV Receiver	JVC C141PFY	2 sets
(3)	Colour Video Monitor	JVC TM 150 PSN	1 set
(4)	Video & Cassette Recorder	EV-S800	1 set
(5)	VHS Video Cassette Recorder	NV-G500	1 set
(6)	VHS Video Cassette Recorder	V-35	1 set

#### 8. Telecine Room

(1)	Video Camera	DXC 1640P	2 sets
(2)	Video Cassette Recorder	VO 5630	1 set

(3) Colour Video Monitor	PVH 2000P	1 set
(4) Camera Adaptor	CMA5CE	1 set
(5) Filmchain Multiplexer	VCR20	1 set
(6) Projector 35mm		1 set
(7) Projector 16mm		1 set

#### 9. Sound Dubbing Room

(1) Microphone	F115	2 sets
(2) Video Cassette Recorder	VO 5630	1 set
(3) TV Receiver	KV 2032ME	1 set
(4) Audio Mixer	MX510	1 set

#### 10. Maintenance Room

(1) Pattern Generator	LCG404	1 set
(2) Oscilloscope	SS7606	1 set

**ສາທາລະນະລັດ ປະຊາທິປະໄຕ ປະຊາຊົນລາວ**  
ສັນຕິພາບ ເອກະລາດ ເອກະພາບ ສັງຄົມນິຍົມ

**ກະຊວງກະສິກໍາ ຊົນລະປະທານ ແລະ ສະຫະກອນກະເສດ**  
ສູນຄົ້ນຄ້ວາ ສໍາຫລວດ ອອກແບບ ຊົນລະປະທານ

**ເອກະສານ**

RESULT (BORING)

(STANDARD PENETRATION TEST & AUGER BORING HOLE METHOD)

PROJECT: TELEVISION STATION  
LOCATION: BAN PHONH TOONG  
VIENTIANE PROVINCE.



ວຽງຈັນ, ວັນທີ 17 /05/ 1987.



Lao peoples Democratic Republic

Peace Independence Unity and Prosperity

-----000-----

Ministry of Agriculture, Forestry  
Institute of Irrigation and Micro-hydropower  
Hydro-Geology survey and Soil test laboratory

No..../IIMN

RESULT (Boring)

(Standard penetration test and auger Boring hole method)

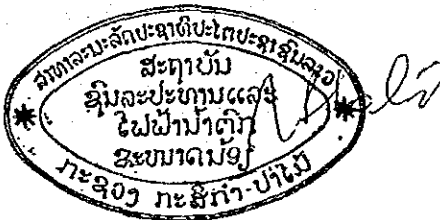
Project : Television station

Location : Ban Phonh Tong

Vientiane, 17/05/91

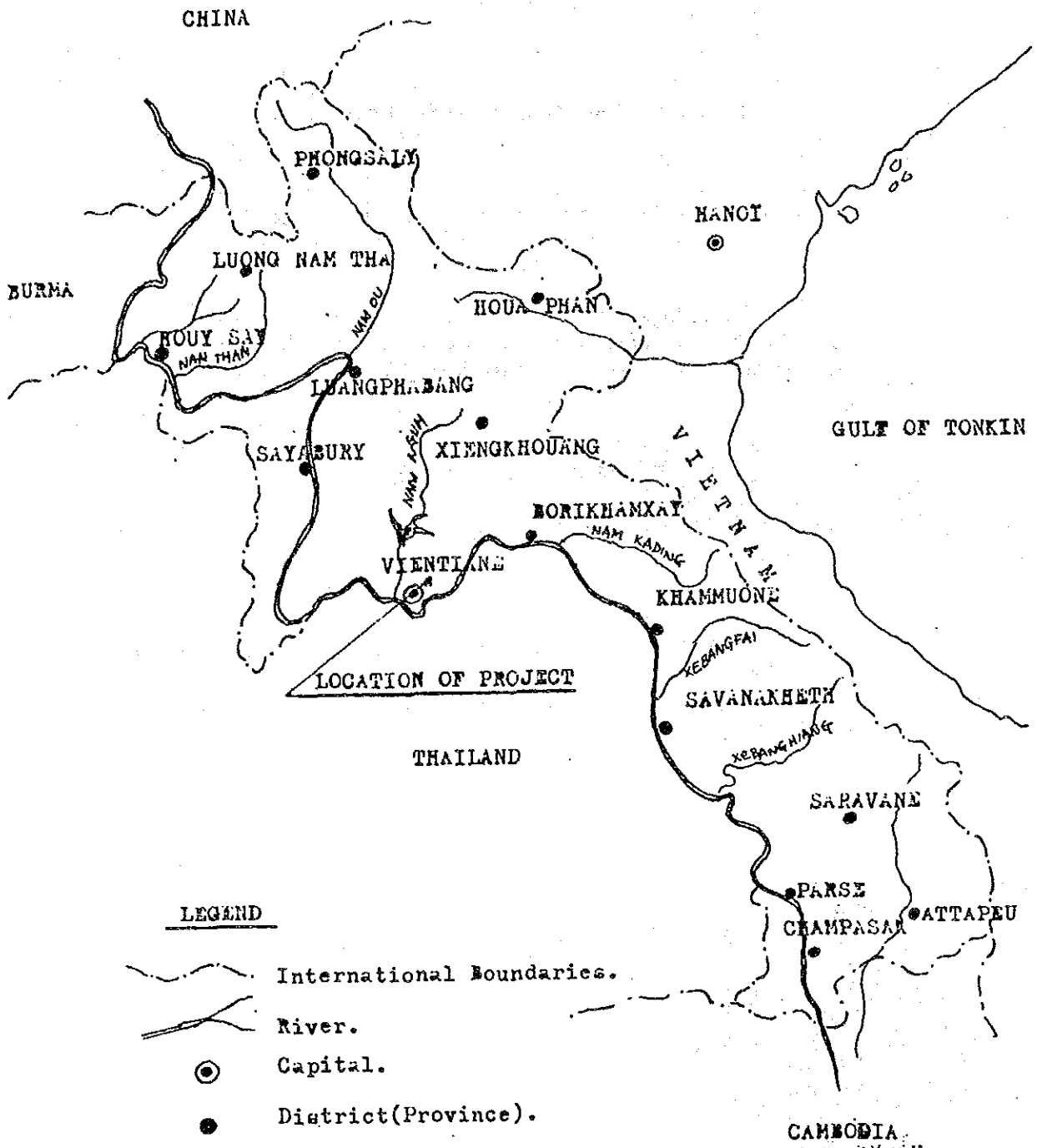
Director of institute  
irrigation and micro-hydropower

Equipment chief



Ing. DOUANGMALA Vongsak

ວັນຄໍາ ທໍາມະຈັກ





According to the contract between Director of television  
 plation and Director of institute irrigation and micro-  
 hydropower No 092/IIMH Date on 8/05/91

Our team work of survey geology has final and got some  
 data.

Drill survey geology foundation with standard Penetration  
 test (SPT) and auger Boring hole method.

Drilling by (SPT) 1.5m, after that Auger Boring hole for  
 getting sample and observation staff of soil. We made until  
 meet uncomfied compressed

Notice:

No of blow	Consistency	
	Granular	Cohesive
0 - 5	Very loose	Very soft
5 - 10	loose	soft
10 - 20	Slightly compact	stiff
20 - 35	compact	Very stiff
35 - 70	dense	hard
70 <	Very dense	Very hard

Result (Boring)

Project : Television Station.

Location : Phonh Tdong (Vientiane province)

Water level :....2.80 m at 24 hrs; Work completed during from 14/05/91.  
 Casing used 3.5"; size 2", wt.of hammer 140 LBS; 30" drop.  
 Standard penetration test (SPT) and Auger boring hole method, total depth 9.74 meters.

Depth		Identification	Log	No of blow per/ft	Shearing strength kg/cm <sup>2</sup>	Unconfined compressive kg/cm <sup>2</sup>	Internal friction (sand)	R/M
FT	M							
1	2	3	4	5	6	7	8	9
1	0.304	Top soil(0.30m)		15	0.82	1.64		
2	0.60	Silty soil (0.60-0.91m)		17	0.93	1.86	30°-33°	
3	0.91	Clay gravel		18	0.98	1.97		
4	1.52	(0.91-1.82m)		27	1.47	2.95		
5	1.52	"-		29	1.58	3.17		
6	1.82	Clay+laterite 35%		30	1.64	3.64		
7	2.13	(1.82-4.26m)		35	1.91	3.83		
8	2.43	"-		36	1.97	3.94		
9	2.74	"-		40	2.18	4.37		
10	3.04	"-		44	2.40	4.81		
11	3.35	"-		45	2.46	4.92		
12	3.65	"-		47	2.59	5.14	33°-37°	
13	3.96	"-		47	2.59	5.14		
14	4.26	Clay+laterite 5%		36	1.97	3.94		
15	4.57	(4.26-6.70m)		37	2.02	4.05		
16	4.87	"-		37	2.02	4.05		
17	5.18	"-		34	1.86	3.72		
18	5.48	"-		34	1.86	3.72		
19	5.79	"-		45	2.46	4.92		
20	6.09	"-		50	2.73	5.47		
21	6.40	"-		50	2.73	5.47		
22	6.70	Clay red color		48	2.62	5.25		
23	7.01	(7.01-8.53m)		48	2.62	5.25		
24	7.31	"-		49	2.68	5.36		
25	7.62	"-		50	2.73	5.47		
26	7.92	"-		50	2.73	5.47		
27	8.22	"-		50	2.73	5.47		
28	8.53	Clay white color		28	1.53	3.06		
29	8.83	(8.53-8.83m)		28	1.53	3.06		
30	9.14	red shale		+70	3.83	7.66		No of
31	9.43	"-		+70	3.83	7.66	44+	blow is
32	9.73	"-		+70	3.83	7.66		min +70

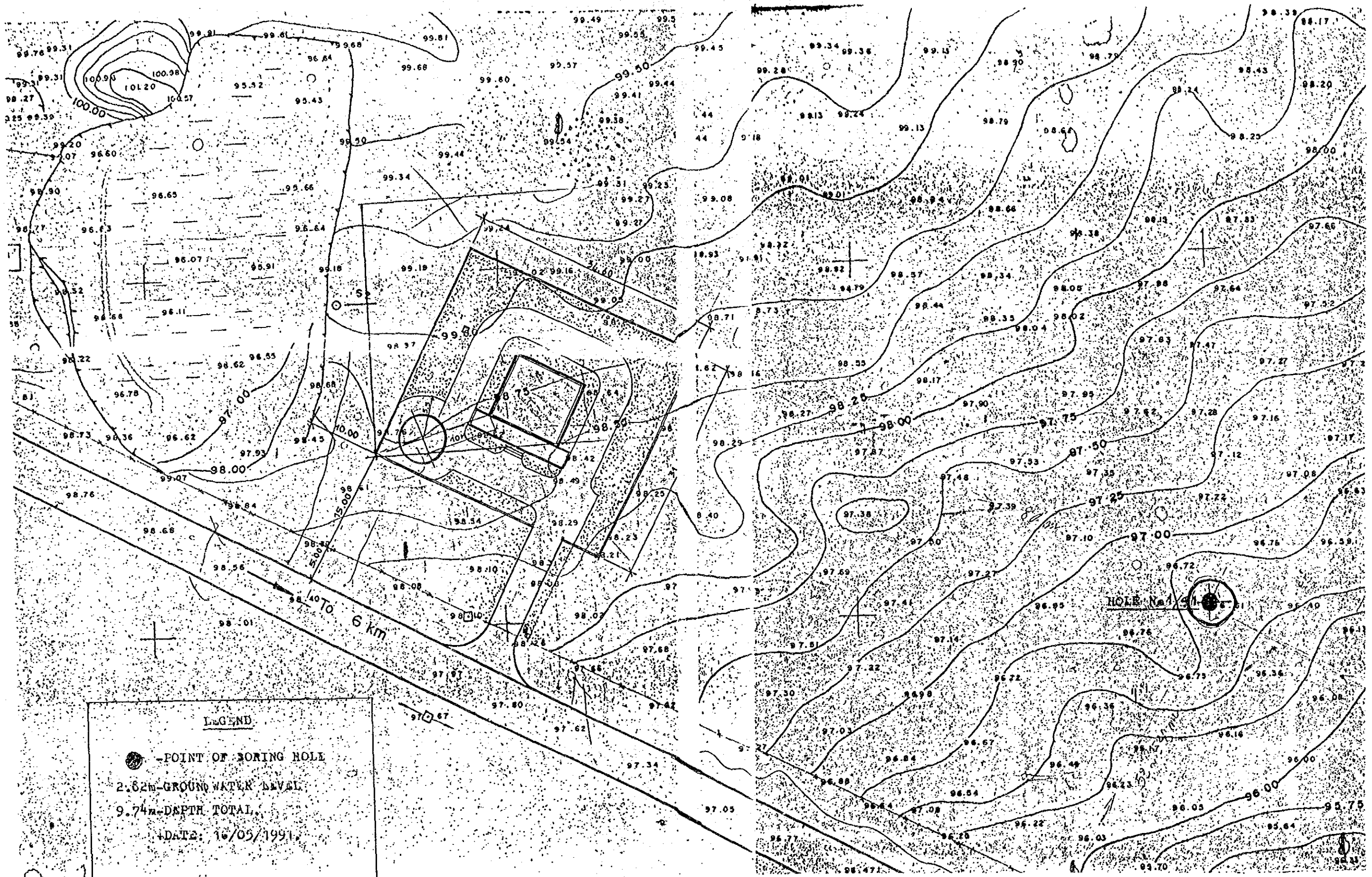
End of boring at 9.74 meters.

The director of institute  
 Irrigation and micro-hydropower

Vientiane, date 17/05/91  
 The chief equipment  
 of geology survey & laboratory.



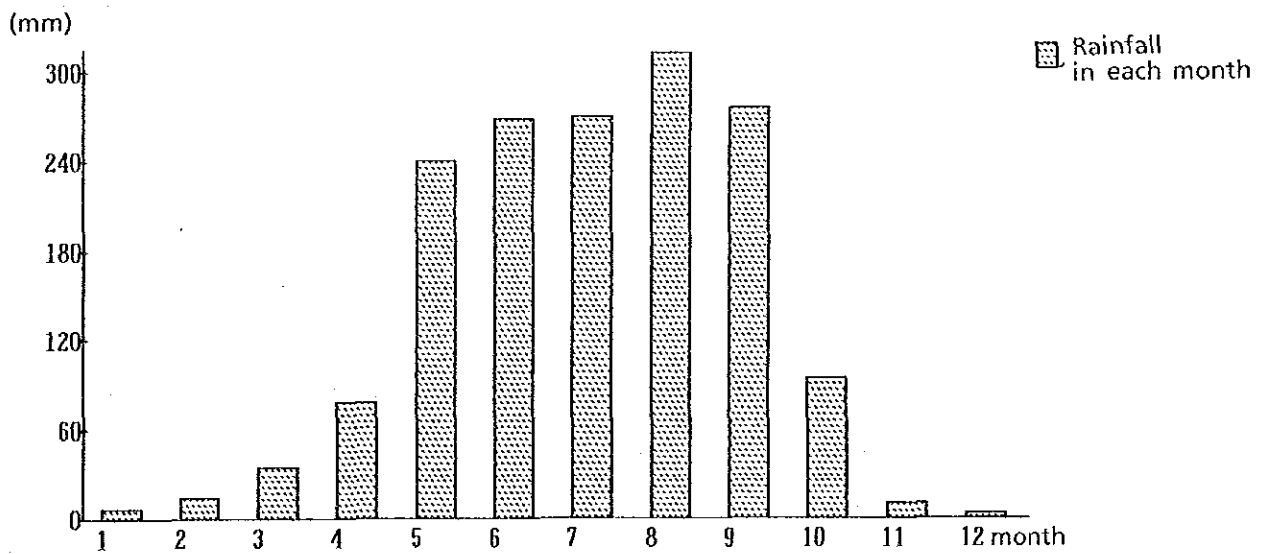
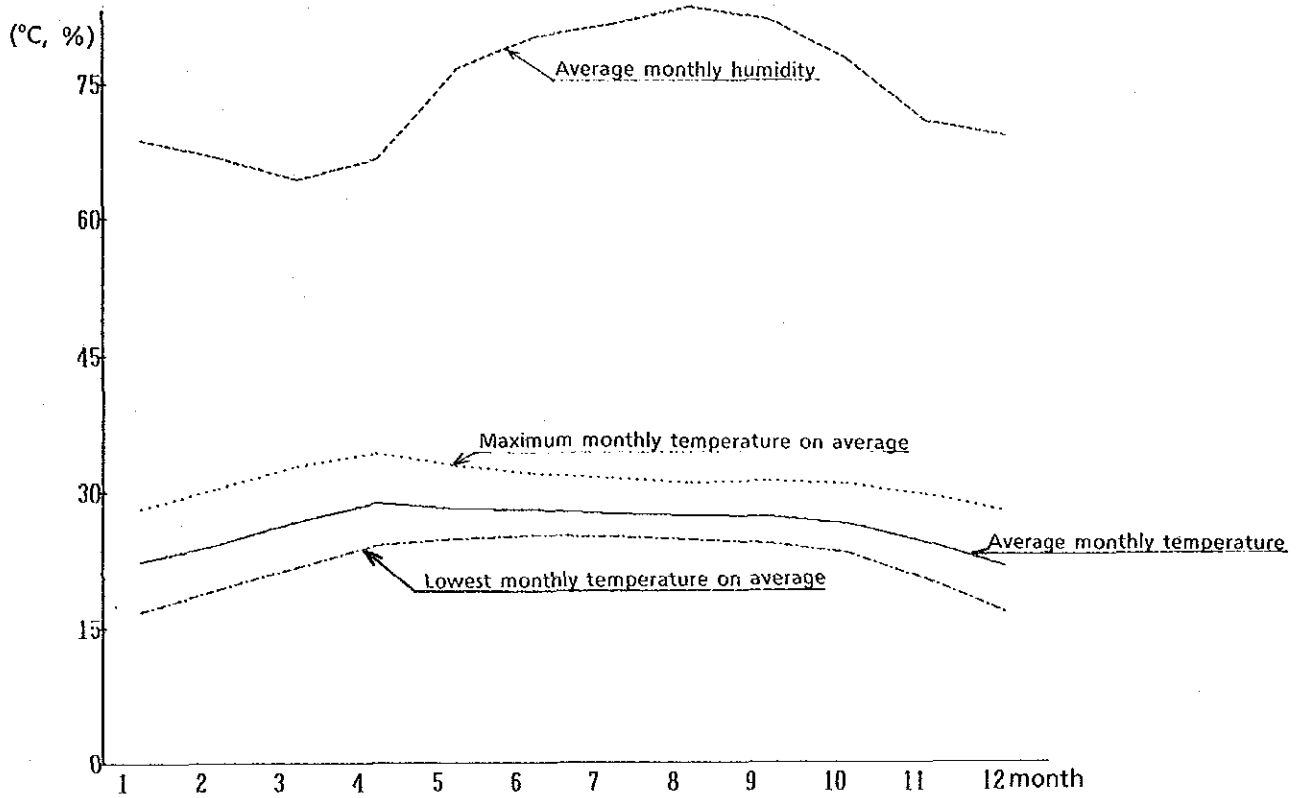
LOCATION OF BORING HOLE







6.5 Temperature, Humidity and Rainfall in Vientiane for the Past Twenty Years (1971 to 1990)



From weather data of the Lao Meteorological Bureau







JICA