

CHAPTER 2 Hardware

2-1 Rehabilitation of High Power Radio Stations

2-1-1 Outline of Existing Facilities

The outline of existing facilities for eight (8) high-power radio stations is shown in Table 2-1-1 and Figs. 2-1-1 and 2-1-2.

Table 2-1-1 Outline of Existing Facilities

Item \ Station Name	Jakarta	Medan	Surabaya	Pekanbam	Palembang	Banjarmasin	U.Pandang	Semarang
1. Transmitter								
(1) Rated Output Power	300 kW (150 kW x 2)	100 kW (50 kW x 2)	100 kW (50 kW x 2)	50 kW (25 kW x 2)	50 kW (25 kW x 2)	50 kW (25 kW x 2)	100 kW (50 kW x 2)	10 kW (10 kW + 10 kW)
(2) Output Frequency	999 kHz	855 kHz	585 kHz	927 kHz	1287 kHz	1134 kHz	630 kHz	801 kHz
(3) Type of Cooling	vapour	air	air	air	air	air	air	air
(4) Tube : Power Amplifier	4CV50000EX2	4CX35000C	4CX35000C	4CX15000AX2	4CX15000AX2	4CX15000AX2	4CX35000C	8F67R
Modulator	4B38X2 4CV50000EX2	4CX15000AX2	4CX15000AX2	4CX10000DX2	4CX10000DX2	4CX10000DX2	4CX15000AX2	8F67RX2
Exciter	4CX1500B	5F23A	5F23A	4-400A	4-400A	4-400A	5F23A	Transister
(5) Type	MBN-7252 (150 kW)	RM-55C (50 kW)	RM-55C (50 kW)	MBN-7244 (25 kW)	MBN-7244 (25 kW)	MBN-7244 (25 kW)	RM-55C (50 kW)	RM-51C (10 kW)
2. Antenna System								
(1) Height	110 m	174 m	180 m	130 m	110 m	130 m	180 m	140 m
(2) Structure	Triangle Truss	Triangle Truss	Triangle Truss	Triangle Truss	Triangle Truss	Triangle Truss	Triangle Truss	Triangle Truss
(3) Type of Feeder Line	8-wire	6-wire	6-wire	6-wire	6-wire	6-wire	6-wire	6-wire
3. Power Supply System								
(1) Capacity of E/G a.	900 kVA x 2	300 kVA x 2	300 kVA x 2	175 kVA x 2	175 kVA x 2	175 kVA x 2	300 kVA x 2	60 kVA x 2
b.	35 kVA x 2	35 kVA x 2	35 kVA x 2	35 kVA x 2	35 kVA x 2	35 kVA x 2	35 kVA x 2	35 kVA x 2
(2) City Power Source	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes

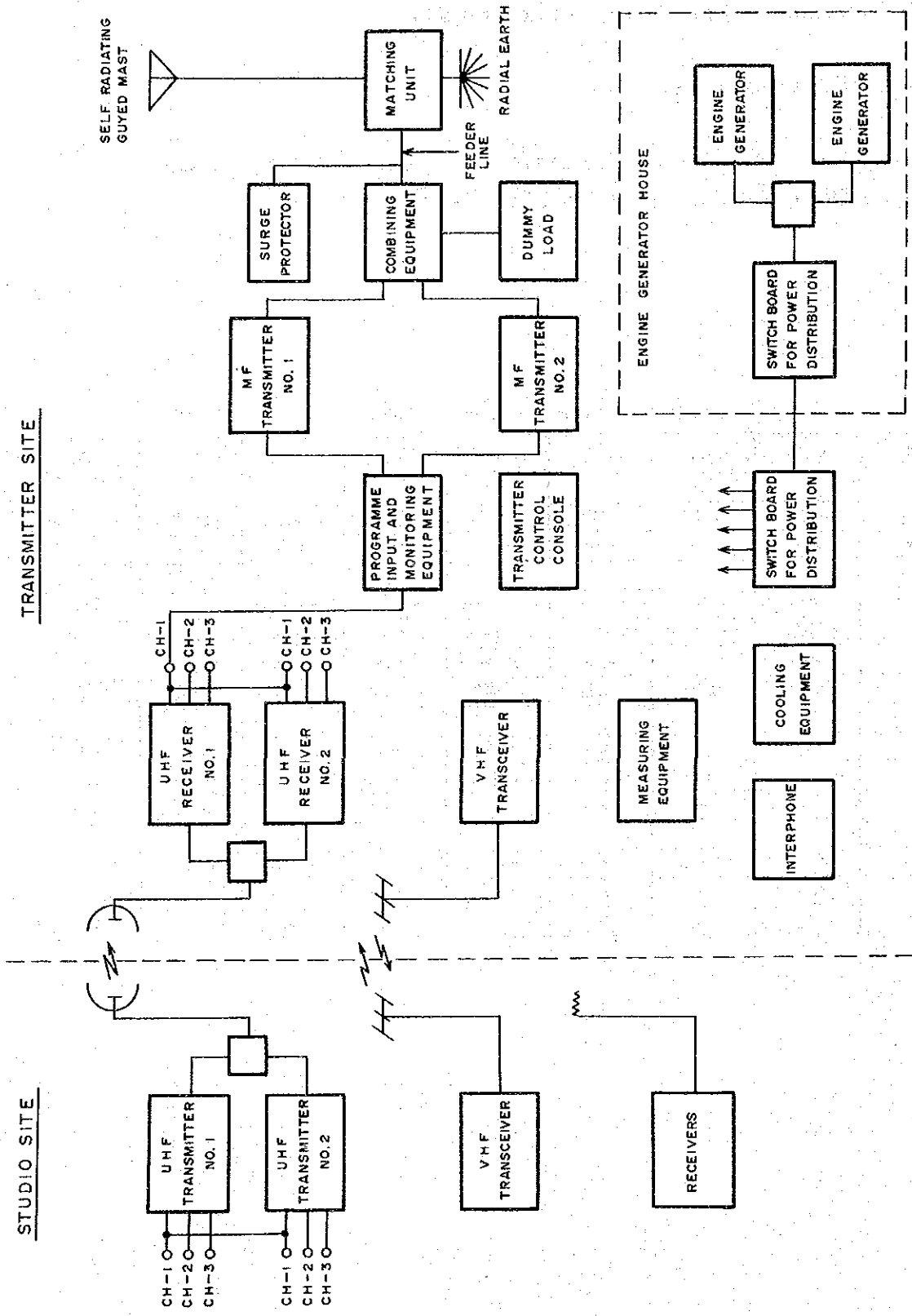


Fig. 2-1-1 SCHEMATIC DIAGRAM OF EXISTING SYSTEM
 (Jakarta, Medan, Surabaya, Pekanbaru, Pekanbaru,
 Banjarmasin and Ujung Pandang)

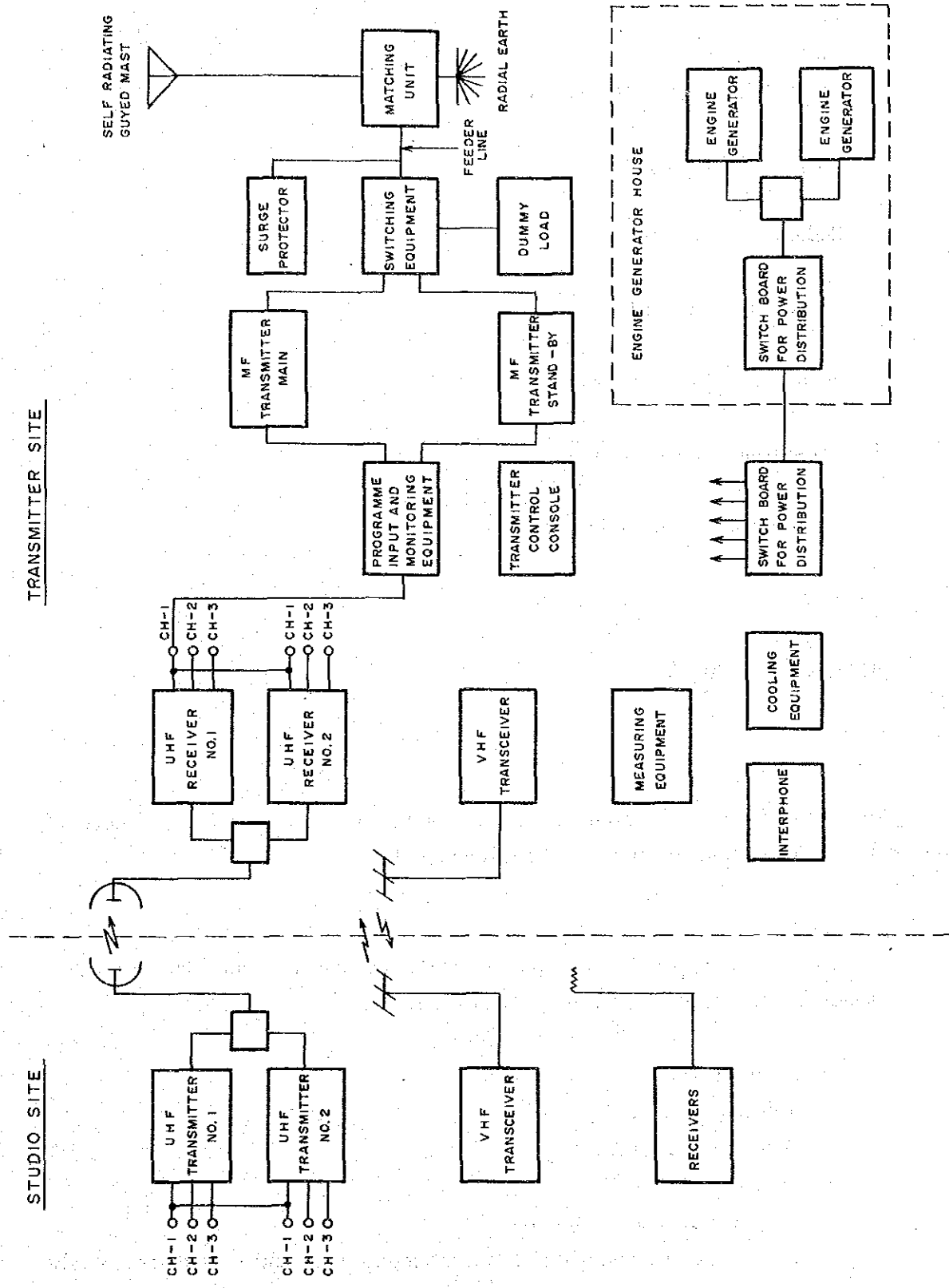


Fig. 2-1-2 SCHEMATIC DIAGRAM OF EXISTING SYSTEM
(Semarang)

2-1-2 Scope of Works

(1) Sites

The sites to be planned are as follows;

- 1) Jakarta, Cimanggis
- 2) Medan, Padang Cermin
- 3) Surabaya, Mojosari
- 4) Pekanbaru, Simpang Baru
- 5) Palembang, Indra Laya
- 6) Banjarmasin, Sungai Tabuk
- 7) Ujung Pandang, Bontosunggu
- 8) Semarang, Kuripar

(2) Works

The works to be implemented at each site are, in principle, thorough overhauls. The requirements are mentioned below.

1) Renewal

The following units and parts shall be renewed and the suitable amount of spare parts shall be supplied.

(a) Transmitter

- Tubes & Sockets
- Breeder Resistors
- Audio Amplifier
- Control System & Console
- Measuring Instruments (Oscilloscope, Frequency Counter, Audio Test Set, Signal Generator and Modulation Meter)

- Oil Paper Condensers
 - Dry Type Choke Coils for High Tension Rectifier
 - Canvas for blowers
 - Multiple Check Metres
 - Dry Type Modulation Transformers
 - Cooling Fans
 - Monitors
 - Surge Protectors
 - Metres & Current Transformers
 - Silicon Rectifier
 - Chemical Condensers
 - Contact Materials
 - Wiring
 - Lamp & Fuse
- (b) Antenna System
- Drain Coil of ATU (Jakarta only)
 - Austine Transformers and Wiring
- (c) Power Supply System
- Batteries & Chargers
 - AVR's for Engine Generators
 - Metres
 - Gaskets
 - Packing
 - Piston Rings
 - Nozzles
 - Contact Materials
 - Chemical Condensers
 - Metres
 - Wiring
 - Lubricating Oil
 - Bearings
 - Lamp & Fuse

2) Repairs

The following damaged points shall be repaired

- Feeder Line (Jakarta only)
- Painting of Mast
- A Choke Coil of Guyed Wires (Pekanbaru only)
- Engine Dummy
- Air Compressors (Surabaya, Banjarmasin and Ujung Pandang)
- Cooling Tower (except Semarang)

3) Modifications

The following troubles that happen in common shall be studied and suitable counterplans shall be considered.

- Dry Type Transformers and Choke Coils
- Lamps (to be changed to LED)
- Oscilloscope
- Universal Counter
- Monitor

4) Cleaning up

All equipment diverted from existing ones shall be cleaned up.

5) Readjustment

After completion of rehabilitation work, all systems shall be checked and readjusted.

6) FM Broadcasting and Studio to Transmitting Station Link (Pekanbaru, Palembang and U. Pandang)

A one (1) kW FM transmitter with a standby transmitter and a transmitting antenna system shall be installed on the Studio site and an FM receiving system shall be installed on the transmitting site.

The FM broadcasting system shall be used not only for broadcasting but also for programme transmission. This item shall apply to Pekanbaru, Palembang and U. Pandang stations because five (5) other stations have plans to establish an FM broadcasting

system under another project. No rehabilitation work for the UHF link shall be taken into consideration.

7) On-the-job training

On-the-job training shall be carried out by manufacturer's experts during the rehabilitation work period.

(3) Local Side Works

The following local side works related to the above works shall be carried out, if necessary.

- Modification of building and facilities
- Coordination

2-1-3 Effects

The expected coverage area by the eight (8) high-power radio stations is 492,000 km² and the population coverage is about 45% (About 78 million) of Indonesia's total population. However, with the output of transmitters, at present, having dropped by a half or more, it is estimated that the greater part of the above-expected coverage area will be lost.

If this situation could be brought back to the original state, a big effect would be produced.

But, if things were left as they are, the result would be a loss of a large service area as described above.

2-2 Rehabilitation of TV Transmitting Stations

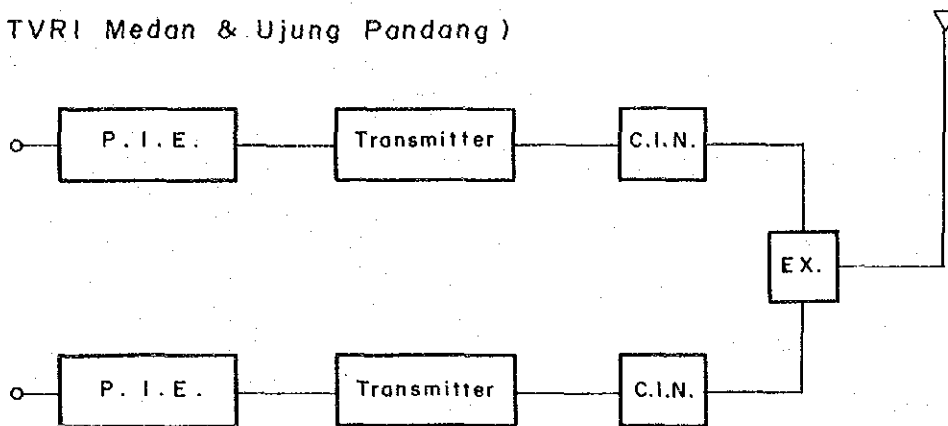
2-2-1 Outline of Existing Facilities

The outline of existing facilities for five (5) TV transmitting stations is shown in Table 2-2-1 and Fig. 2-2-1.

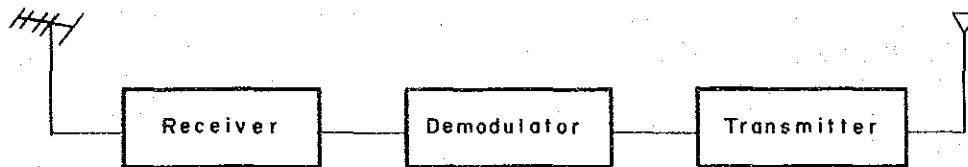
Table 2-2-1 Outline of Existing Facilities

Item \ Station Name	Medan	Ujung Pandang	Gn. Mangkol	Gn. Tajam	Gn. Muncung
1. Main Transmitter					
(1) Visual Output Power	10 kW	1 kW	1 kW	1 kW	1 kW
(2) Aural Output Power	1 kW	100 W	100 W	100 W	100 W
(3) Transmitting Channel	5	4	4	5	8
(4) Manufactured Date	January, 1980	January, 1980	1972	September, 1972	August, 1973
(5) Receiving Channel	—	—	6	7	5
2. Stand-by Transmitter			Nil		Nil
(1) Visual Output Power	10 kW	1 kW	—	1 kW	—
(2) Aural Output Power	2 kW	100 W	—	100 W	—
(3) Transmitting Channel	5	4	—	5	—
(4) Manufactured Date	March, 1970	1972	—	November, 1982	—
(5) Receiving Channel	—	—	—	TVRO	—
3. Antenna					
(1) Transmitting Antenna	2-Dipole 6 stacks, 2 faces	Supergain 2 stacks, 3 faces	4-Dipole 2 stacks, 2 faces	4-Dipole 4 stacks, 4 faces	4-Dipole 2 stacks, 4 faces
(2) Main Fuder	77D equivalent	39D equivalent	150D equivalent	39D equivalent	39D equivalent
(3) Receiving Antenna	—	—	14-element YAGI	14-element YAGI 5 m Parabolic Antenna	14-element YAGI
(4) Tower Height	55 m	75 m	50 m	50 m	50 m

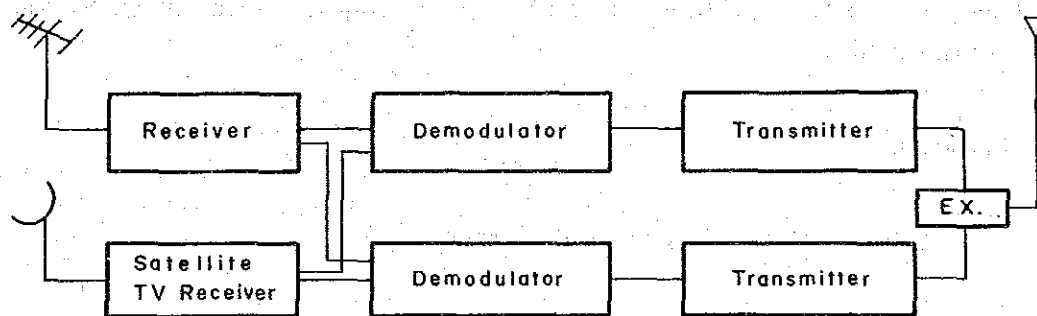
(TVRI Medan & Ujung Pandang)



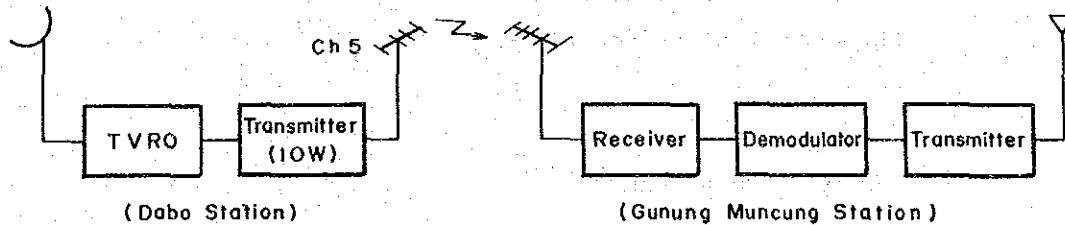
(TVRI Gunung Mengkol)



(TVRI Gunung Tajam)



(TVRI Gunung Muncung)



(Dabo Station)

(Gunung Muncung Station)

Fig. 2-2-1 BLOCK DIAGRAM OF EXISTING SYSTEM

2-2-2 Scope of Works

(1) Sites

The sites to be planned are as follows;

- 1) Medan
- 2) Ujung Pandang
- 3) Gn. Mangkol
- 4) Gn. Tajam
- 5) Gn. Muncung

(2) Works

The works to be implemented at each site are, in principle, renewal of transmitter and ancillary equipment. The requirements of each station are mentioned below.

1) Medan

- (a) Renewal of standby transmitter
- (b) Overhaul of transmitting antenna system
 - Replacement of main feeder
 - Replacement of junction box
 - Replacement of branch feeders
 - Readjustment
- (c) Supply of spare parts

2) Ujung Pandang

- (a) Renewal of standby transmitter

(b) Overhaul of transmitting antenna system

- Replacement of main feeder
- Replacement of junction box
- Replacement of branch feeders
- Readjustment

(c) Supply of spare parts

3) Gn. Mangkol

(a) Renewal of main transmitter

(b) Setting up of standby transmitter

(c) Overhaul of receiving and transmitting antenna system

- Replacement of main feeder
- Replacement of junction box
- Replacement of branch feeders
- Readjustment

(d) Supply of spare parts

4) Gn. Tajam

(a) Renewal of main transmitter

(b) Setting up of space diversity receiving antenna system

(c) Renewal of two (2) sets of engine generator

(d) Overhaul of VHF receiving and transmitting antenna system

- Replacement of main feeder
- Replacement of junction box
- Replacement of branch feeders
- Readjustment

(e) Supply of spare parts

5) Gn. Muncung

- (a) Renewal of main transmitter
- (b) Setting up of standby transmitter
- (c) Shifting of TVRO from Dabo station to Gn. Muncung station
- (d) Overhaul of transmitting antenna system
 - Replacement of main feeder
 - Replacement of junction box
 - Replacement of branch feeders
 - Readjustment
- (e) Supply of spare parts

(Remarks) ① The signal received at Gn. Tajam station is sent across the sea from Gn. Muntai station which is located 150 km away.

Because of the above conditions, Gn. Tajam station is often troubled with fading. In order to solve the problem, it is considered necessary that VHF receiving facilities will be installed near the existing engine generator house and combined with the existing VHF receiving antenna system to make a space diversity receiving system.

② One (1) set of 106 kVA engine generator and one (1) set of 65 kVA engine generator are working at the Gn. Tajam station but the conditions of those generators are not so good.

(3) Local Side works

The following local side works related to the above works shall be carried out.

- Improvement of the interior of the station house for Gn. Tajam station (Many parts of ceiling concrete in the

transmitting room are peeled off and iron structures are exposed)

- Coordination

2-2-3 Effects

The estimated total population coverage of the five (5) TV broadcasting stations is about five (5) million. Offering a stable broadcasting service to all these people would produce an enormous effect.

2-3 Establishment of a Maintenance System

2-3-1 The Object of Work

In order to establish a maintenance system, the functions of the existing Engineering Centre (hereafter EC) shall be uplevelled and two regional ECs shall be newly constructed, so that a maintenance base may be set up at each of the three ECs. Furthermore, in order to reinforce the maintenance system at each of the regional broadcasting stations, measuring equipment and spare parts shall be supplied in full to each station.

2-3-2 Present Condition of Proposed Sites for EC

(1) Jakarta

The existing EC building is so small that it cannot be used as a maintenance base.

As possible sites for construction of new buildings, there are two; one within the premises of TVRI's Jakarta Komplek and the other on the site of RRI's Radio Daram Transmitting Station. At either of the two sites, there is the need of pulling down the existing building.

(2) Medan

In the city, there is a patch of ground owned by the RRI as a possible site for construction of a maintenance base. Since it has an ample space, this piece of land shall be earmarked as a possible construction site for a maintenance base.

(3) Ujung Pandang

RRI's Jongaya Shortwave Transmitting Station shall be designated as a possible construction site for a maintenance base.

In this case, a maintenance base may be set up by remodelling the existing building of the Jongaya Shortwave Transmitting Station.

2-3-3 Scope of Work

(1) Construction of Maintenance Base

1) EC Jakarta Headquarters

A building will be newly constructed, equipped with a workshop, warehouses, office rooms and a garage. (Fig. 2-3-1, 2-3-2)

Total floor space: About 2,300m²

(Either two or three storied)

Possible sites for construction of the new building:

(a) Within the premises of TVRI's Jakarta Komplek (Fig. 2-3-3)

(b) Within the premises of RRI's Radio Daram Transmitting Station (Fig. 2-3-4)

A construction plan will be drawn up for each of the above-mentioned two possible construction sites.

2) Regional EC Medan

A building will be newly constructed, equipped with a workshop, warehouses, office rooms and a garage.

Total floor space: About 600m²

Possible construction site: (Fig. 2-3-5)

A part of the patch of land owned by RRI's Medan station reserved for construction of employees' houses. (Fig. 2-3-6)

3) Regional EC Ujung Pandang

Since the existing building at RRI's Jongaya Shortwave Transmitting Station can be used as the maintenance base, this building will be remodelled into one that houses a workshop, warehouses, office rooms and a garage.

Total floor space: About 500m² (Fig. 2-3-7, 2-3-8)

(2) Contents of the Maintenance Base

1) Workshop

This workshop will be equipped with various tools and machine-tool facilities so that maintenance work may be conducted on a continual basis.

2) Warehouse

At each of the maintenance bases, a warehouse consisting of two or three rooms will be constructed so that measuring equipment, substitutive facilities and spare parts may be stored.

3) Office Rooms

These will be used for technical administration work.

4) Measuring equipment and Substitutive Facilities

These will be used by the staff of the maintenance base in supporting the maintenance work at the stations within the area in charge. (Tables 2-3-1~3)

5) CPU System

A CPU will be set up at each maintenance base with which to conduct technical administration of the base.

6) Storage of Spare Parts

At each of the maintenance bases, the spare parts necessary for the repair of the various items of equipment currently used by the stations in the area in charge will be stored so that such spare parts may be supplied to each station according to the maintenance plan.

(3) Allocation of Necessary Measuring Equipment

The measuring equipment for day-to-day maintenance use will be allocated to the following RRI and TVRI stations so as to meet their requirements.

1) RRI Regional Stations (18 Stations)

Sibolga	Malang	Gorontalo
Tanjung Pinang	Madium	Wamena
Bandung	Jember	Serui
Bogor	Sumenep	Manokwari
Cirebon	Denpasar	Nabire
Puruwokerto	Singaraja	Merauke

2) TVRI Regional Stations (15 STATIONS)
(Studio & MPU)

Banda aceh	Yogyakarta	Banjarmasin
Padan	Surabaya	Balikpapan
Palembang	Denpasar	Manado
Bandung	Kupang	Jayapura
Semarang	Pontianak	Ambon

3) TVRI Regional Stations (9 STATIONS)
(Transmitter only)

Pekanbaru	Tanjung Karang	Palu
Jambi	Mataram	Kendari
Bengkulu	Palangkaraya	Dili

The number of stations to which the equipment will be allocated and the types of measuring equipment to be supplied are shown in Tables 2-3-1~2 attached hereto.

(The measuring equipment is not allocated to where measuring instruments are to be arranged under the on-going project and to the small scale TV relay stations.)

(4) Spare Parts

The supply of spare parts will be conducted for the maintenance of equipment and facilities in current use. Such spare parts will be distributed to each maintenance base to be stored for supply to different stations according to the maintenance plan.

(5) Construction Expenses

1) Foreign currency

Measuring equipment, substitutive facilities, other facilities.

2) Local currency

Construction cost of the building, and procurement of interior equipment.

3) Total budget

Foreign currency 1,681,000 (thousand Yen)

Local currency 1,295,000 (thousand Rupiah)

2-3-4 Effects

The following effects can be expected by the completion of this maintenance system and the resultant reinforcement of the organizational setup:

- (1) The reinforcement of the functions of the EC HQ, the establishment of regional ECs and exchanges/accumulation of technical information and materials will enable the management of technical facilities to be carried out in association with the whole range of planning, construction and maintenance of facilities. Thus, the maintenance plans, too, can be drawn up accordingly so that the maintenance work as mentioned later on may also be conducted efficiently.
- (2) The completion of the maintenance system will enable the conducting of regular rounds of detailed check-ups by the highly skilled engineers from the maintenance bases using high-precision measuring instruments. As a result, the HQ become able to have an accurate grasp of the conditions of technical facilities and, at the same time, to maintain the functions of such facilities.
- (3) At each workshop at the maintenance bases, it becomes possible for the staff to easily carry on such works as repairs and overhauling of small units of equipment. Moreover, the completed maintenance system can also be used effectively for the training given to the maintenance staff at each station within the area in charge, so as to enhance the level of the staff's ability.
- (4) The allocation of the required measuring instruments and spare parts to the regional stations will ensure smooth running of the routine

check-ups and exchanging of deteriorated parts. In addition to the effects of the itinerant check-ups as mentioned above, such improvements as the prevention of technical failures and prolongation of the life of equipment can be brought about, thus contributing to the stabilization and high quality of the broadcasting.

2-3-5 Policies for the Future

Under Repelita VI, four additional maintenance bases are planned to be established for the purpose of further improving the density of work.

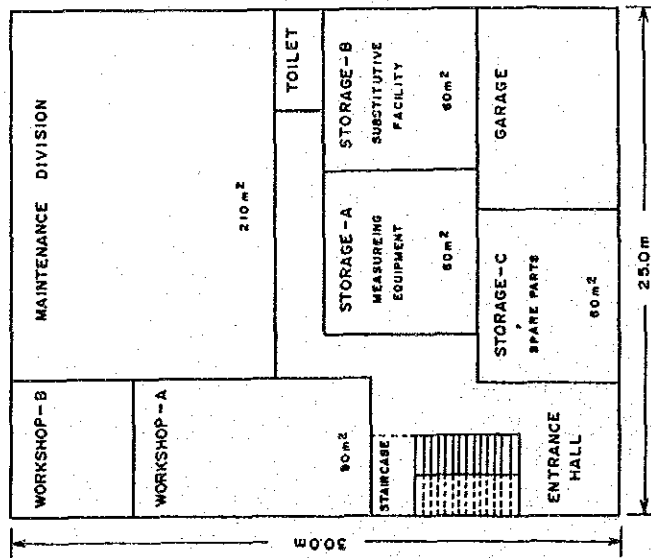
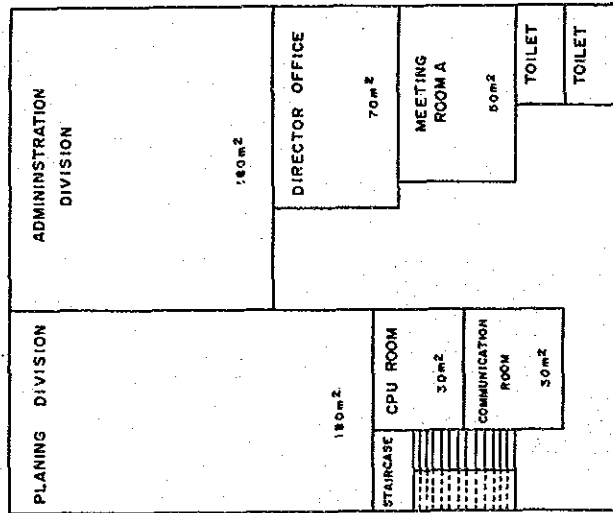
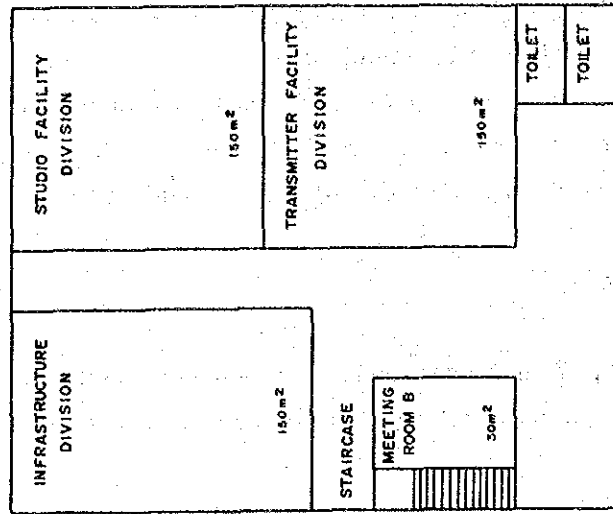


Fig. 2-3-1 The Floor Layout of EC Headquarters (TVRI JAKARTA KOMPLEX) 500

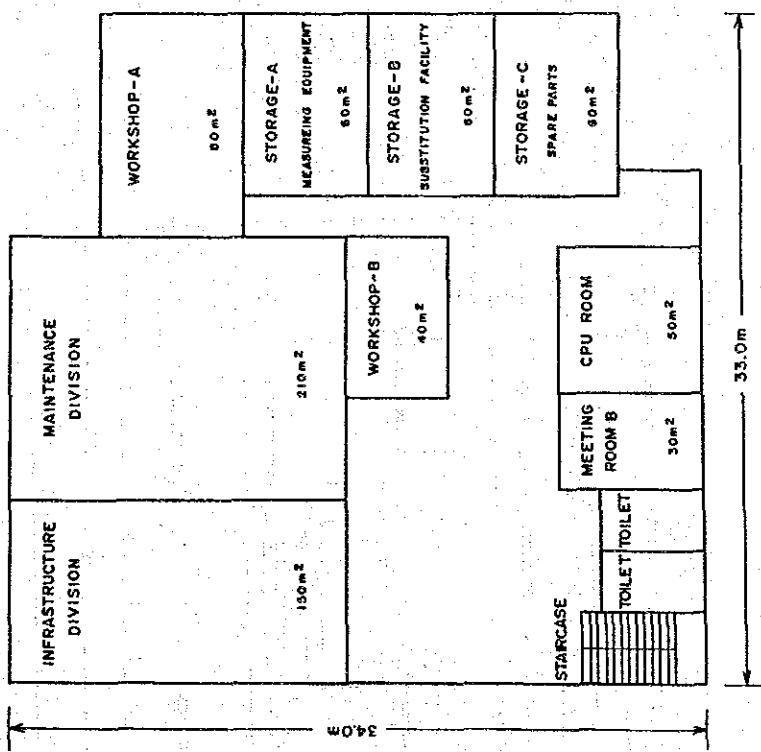
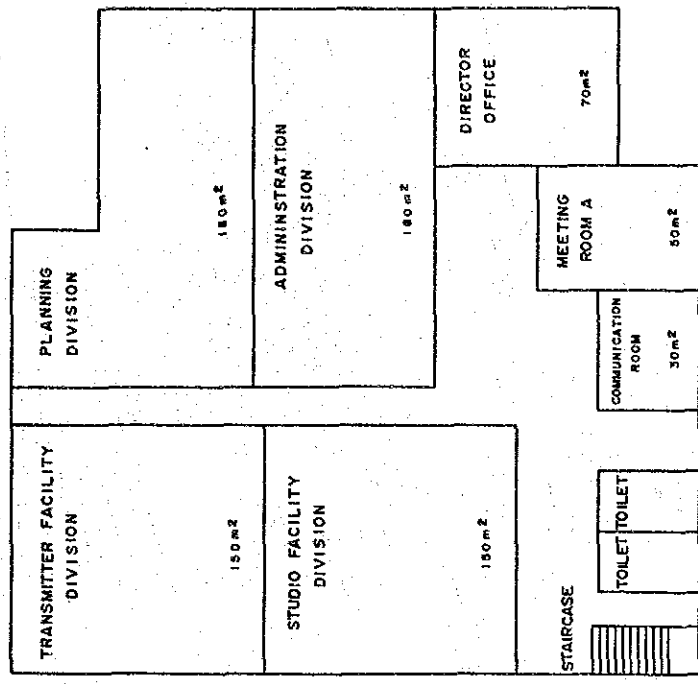
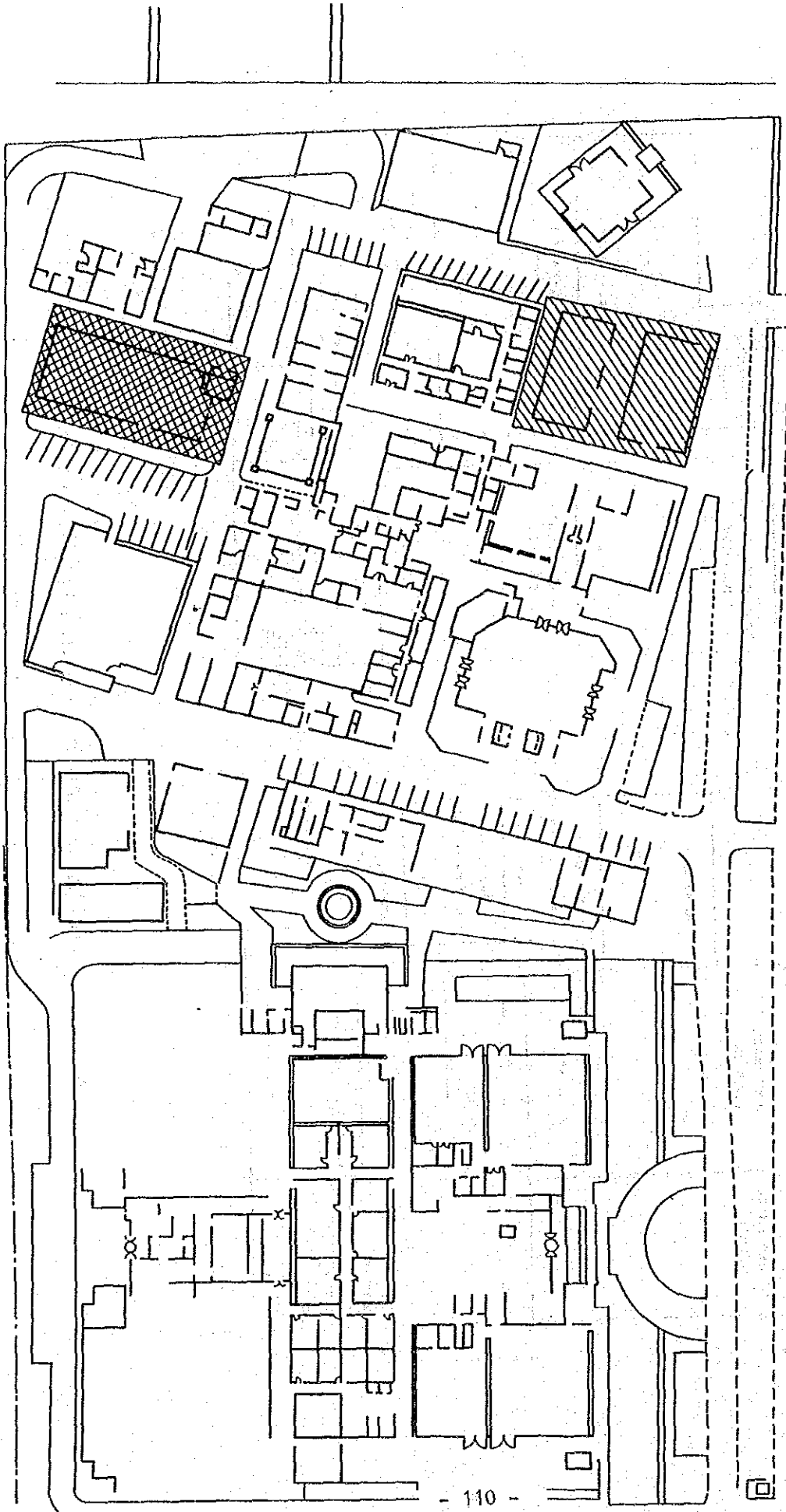


Fig. 2-3-2 The Floor Layout of EC Headquarters (RRI RADIO DALAM) 500



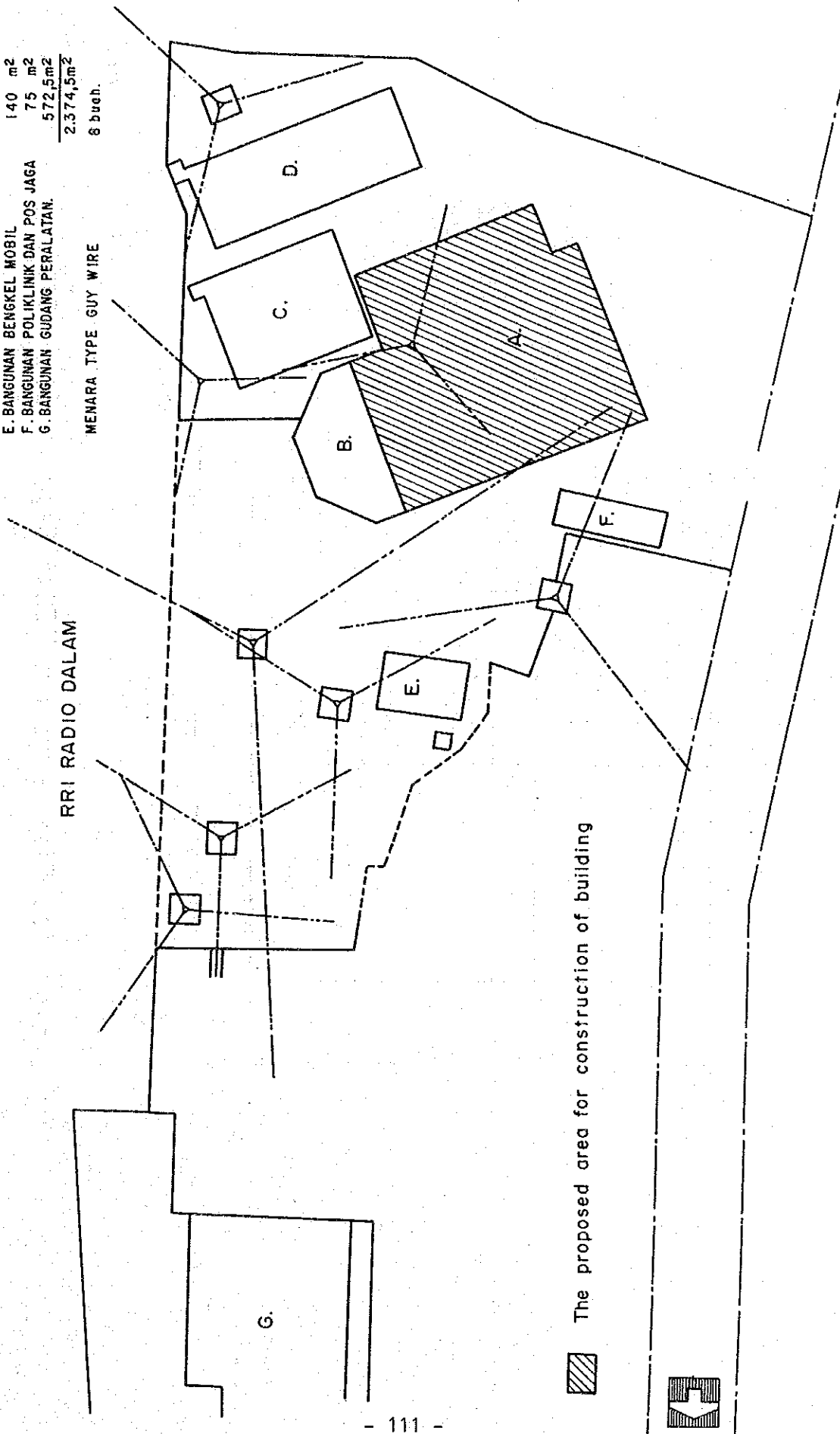
- ▣ : The first proposed area for construction of building
- ▨ : The second proposed area for construction of building

Fig 2-3-3 Proposed Site for JAKARTA HQ of EC (I)

KETERANGAN:

A. GEDUNG BALAI ELEKTRONIKA DAN LAB.	483 m ²
B. GEDUNG EX TATA USAHA RRI.	437 m ²
C. GEDUNG PEMANCAR.	303 m ²
D. GEDUNG DIESEL.	364 m ²
E. BANGUNAN BENGKEL MOBIL	140 m ²
F. BANGUNAN POLIKLINIK DAN POS JAGA	75 m ²
G. BANGUNAN GUDANG PERALATAN.	572,5 m ²
	<u>2.374,5 m²</u>

MENARA TYPE GUY WIRE
6 buah.




 The proposed area for construction of building



Fig 2-3-4 Proposed Site for JAKARTA HQ of EC (2)

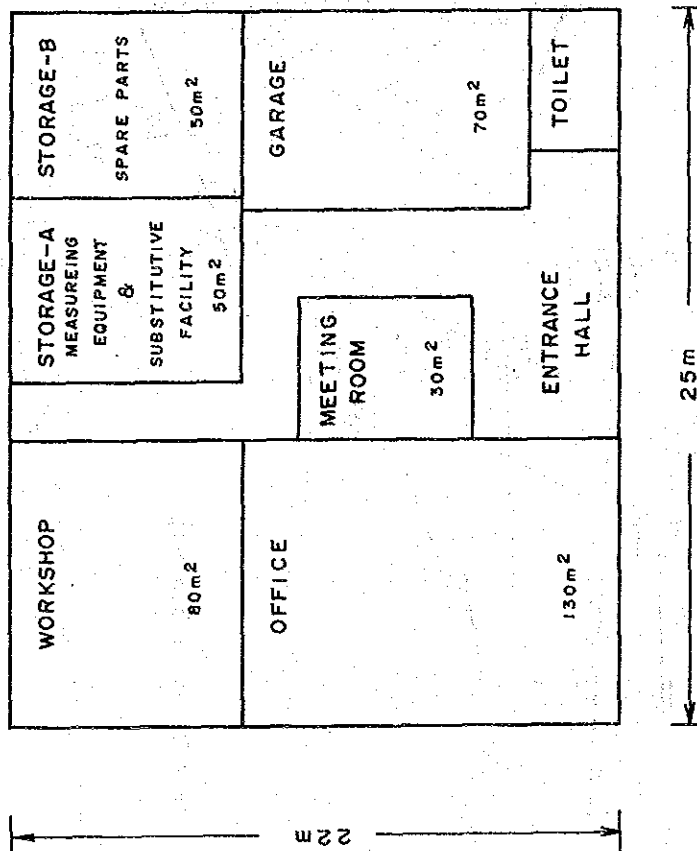


Fig. 2-3-5 The Floor Layout of MEDAN Regional EC 1
250

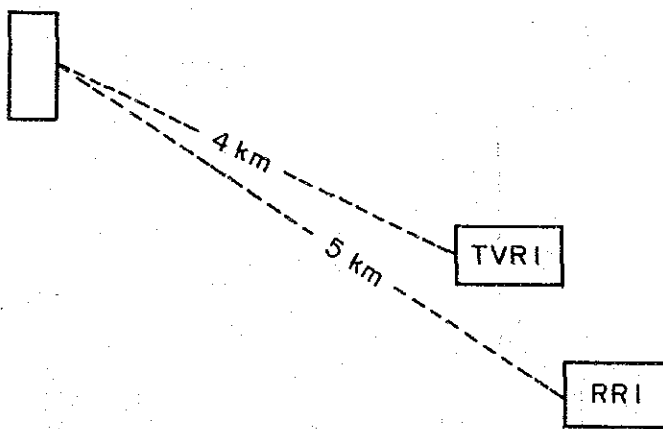
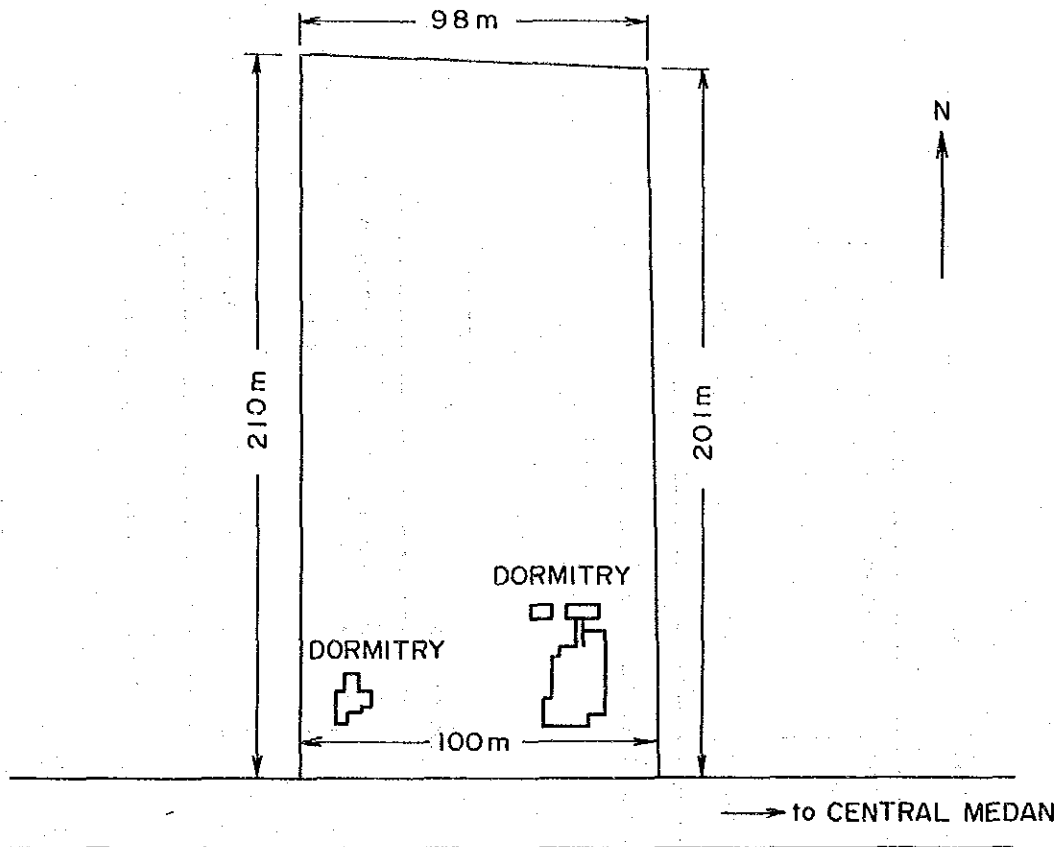


Fig 2-3-6 Proposed Site for MEDAN Branch of EC

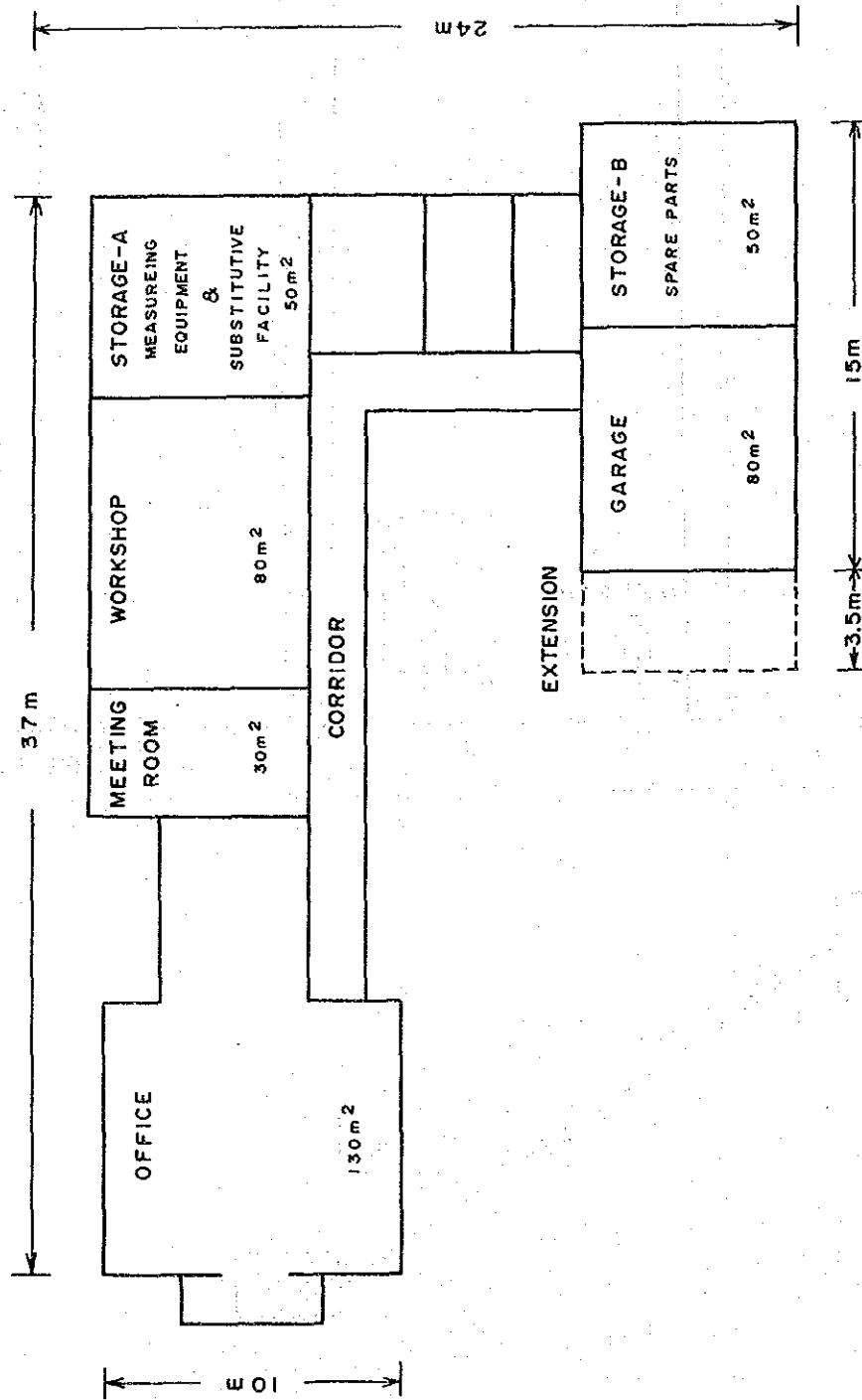
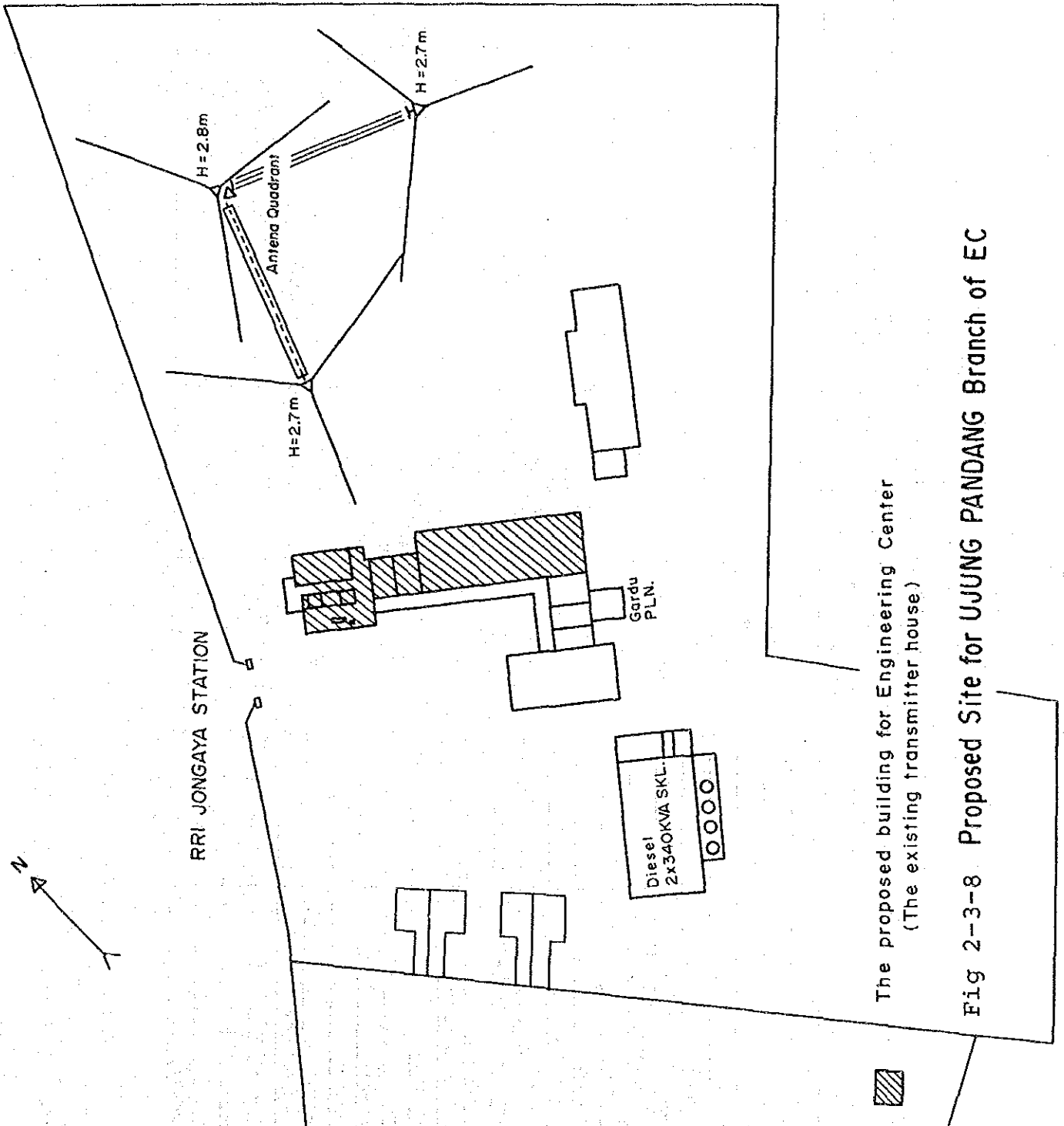


Fig. 2-3-7 The Floor Layout of UJUNG PANDANG Regional EC 1/250



The proposed building for Engineering Center
(The existing transmitter house)

Fig 2-3-8 Proposed Site for UJUNG PANDANG Branch of EC

Table 2-3-1 Measuring Equipment List (1)

Equipment	notes	JAKARTA Headquarters	Regional (2 Bases) Maintenance Base	RRI Regional Station 18 Stations	TVRI Regional Station (Studio or MPU) 15 Stations	TVRI Regional Station (TX only) 9 Stations
Oscilloscope (for R)		2 sets	2 sets	1 set	1 set	
Oscilloscope (for TV)		2 sets	2 sets		5 sets	2 sets
Circuit Tester		10 sets	10 sets	1 set	1 set	
Digital Multi Meter		2 sets	2 sets	1 set	1 set	
Audio Distortion Meter		2 sets	1 set	1 set	1 set	
Audio Attenuator		2 sets	1 set	1 set	1 set	
Insulation Resistance Meter		2 sets	1 set	1 set	1 set	
Earthing Resistance Meter		2 sets	1 set	1 set	1 set	
Wow and Flutter Meter		2 sets	1 set	1 set	1 set	
Wow and Flutter Analyzer		2 sets	1 set			
Frequency Counter		2 sets	1 set			
VHF Power Meter (with Dummy load)		2 sets	1 set	1 set	1 set	
TV Test Signal Generator		2 sets	1 set		1 set	
Wave Form Monitor (with Line Selector)		2 sets	2 sets		1 set	
Illumination Photo Meter		2 sets	1 set		1 set	
Collimator		2 sets	1 set		1 set	
SHF Frequency Analyzer		1 set	1 set			
SHF Power Meter		2 sets	1 set			
SHF Signal Generator		2 sets	1 set			
Field Strength Meter (for R)		2 sets	2 sets	1 set		
Field Strength Meter (for TV)		2 sets	2 sets		1 set	1 set
Network Analyzer (Portable)		2 sets				
Vector Scope		4 sets	2 sets		1 set	
RF Bridge/Oscillator		2 sets	1 set			

Table 2-3-2 Measuring Equipment List (2)

Equipment	notes	JAKARTA Headquarters	Regional (2 Bases) Maintenance Base	RRI Regional Station	TVRI Regional Station (Studio & MPU) 15 Stations	TVRI Regional Station (TX only) 9 Stations
FM Standard Signal Generator		2 sets	1 set			
FM Linear Detector		2 sets	1 set			
VHF Signal Generator		2 sets	1 set			
UHF Signal Generator		2 sets	1 set			
Picture Monitor.(12 inch)		4 sets	2 sets		1 set	1 set
TV Demodulator		2 sets	1 set		1 set	1 set
VHF Sweep Generator		2 sets	1 set			
UHF Sweep Generator		2 sets	1 set			
AM Sideband Analyzer		2 sets	1 set			
Envelope Delay Measuring Equipment		2 sets	1 set			
Video Attenuator		2 sets	2 sets		1 set	1 set
SHF Frequency Counter		1 sets	1 sets			
Portable Engine Generator	1 KVA	2 set	2 set		1 set	1 set
Tool and Machine Tool etc		1 set	1 set			

Table 2-3-3 Substitutive Facility List

Substitutive Facility and Others	notes	JAKARTA	Regional (2 Bases)
		Headquarters	Maintenance Base
Color Camera (CCD)		3 sets	2 sets
Cassette VTR Betacom BVW-75		2 sets	2 sets
Cassette VTR U-Matic BVU-95 (Included TBC)		2 sets	2 sets
Portable Video Switcher		2 sets	1 set
Sync Generator (Included Test Signal Generator)		2 sets	1 set
Portable Audio Console		2 sets	1 set
SDA		2 sets	1 set
VDA		2 sets	1 set
ADA		2 sets	1 set
Portable MW Transmitter 100W	with Handy Trunk	1 set	
Portable TV Transmitter VHF 100W	with Handy Trunk	1 set	
Portable TV Transmitter VHF 1kW		1 set	
Field Service Car	4WD Wagon	2 sets	2 sets
Vehicle	4WD Wagon	4 sets	2 sets
CPU (Personal Computer)		7 sets	1 set

2-4 Introduction of TV Up-Links

2-4-1 Outline of the Present Conditions

The news materials for TVN-I covered by the regional stations, for example, are sent to Jakarta in recorded tapes, taking 2-3 days to reach Jakarta.

This would not enable TV news to give full play to its required feature of instantaneity.

Besides, transmission on real time of events of national importance held in regions are not being conducted despite the people's interest in such events.

As mentioned above, the TVN-I programmes are not yet so structured as to effectively taken in the programmes produced by the nine stations, which possess programme-production facilities, so as to respond to the diversified requirements of the people.

In order to solve those problems and to thereby improve the quality of the TVN-I programmes, the mobile-type TV up-link shall be introduced.

2-4-2 Scope of Works

(1) Site

The stations to be introduced are as follows.

1) TVRI Surabaya

2) TVRI Medan

(2) Specification of Mobile TV Up-link

1) Vehicle: It shall be adequate by taking into account the domestic road condition, maneuverability and economical points. The centre gravity of the vehicle shall be made as low as possible.

2) Up-link facility: It shall be composed of Antenna (Common use for transmission and reception), Modulation and

Demodulation device for TV signals, Input and Output device for Video and Audio, Order-Wire device, Variable Test Signal generator, Measuring equipment and so on.

3) Auxiliary Units: In addition to the above mentioned units, the mobile TV Up-link shall be equipped with a Generator device, an Air conditioning device and an Outrigger.

(3) Network Concept

1) Transmission on Real Time

For transmissions from the mobile-type TV up-link to the Palapa satellite, No. 11H transponder will be used and the transmissions will be made to Jakarta via PERUMTEL's ground station at Cibinong. The signal distribution across the country will be conducted from Jakarta via the Cibinong ground station, using No. 8H transponder aboard the Palapa satellite. The network composition is shown in Fig. 2-4-1.

2) Transmission of Programme Materials

Programme materials shall be sent to Jakarta via No. 8H transponder which is currently in use, utilizing the hours during which the transponder is not being used for broadcast.

2-4-3 Effect

Following effect can be expected as a result of execution of this plan.

(1) This system gives full play to its special characteristics of instantaneity through the broadcasting of live coverage of events in the regions and sending of programme materials such as news.

(2) Coverage of daily life of local people gives a more natural view of actual scenes.

This includes rural programmes, such as "our village", "from one

village to another" and "rural development" which focus on providing information about cultivation, plant diseases, water purification, fish breeding and as on.

- (3) Local people may act as live audience as well as participate in the programme itself.
- (4) This system serves as the first step for introduction of the conference system which TVRI plans.

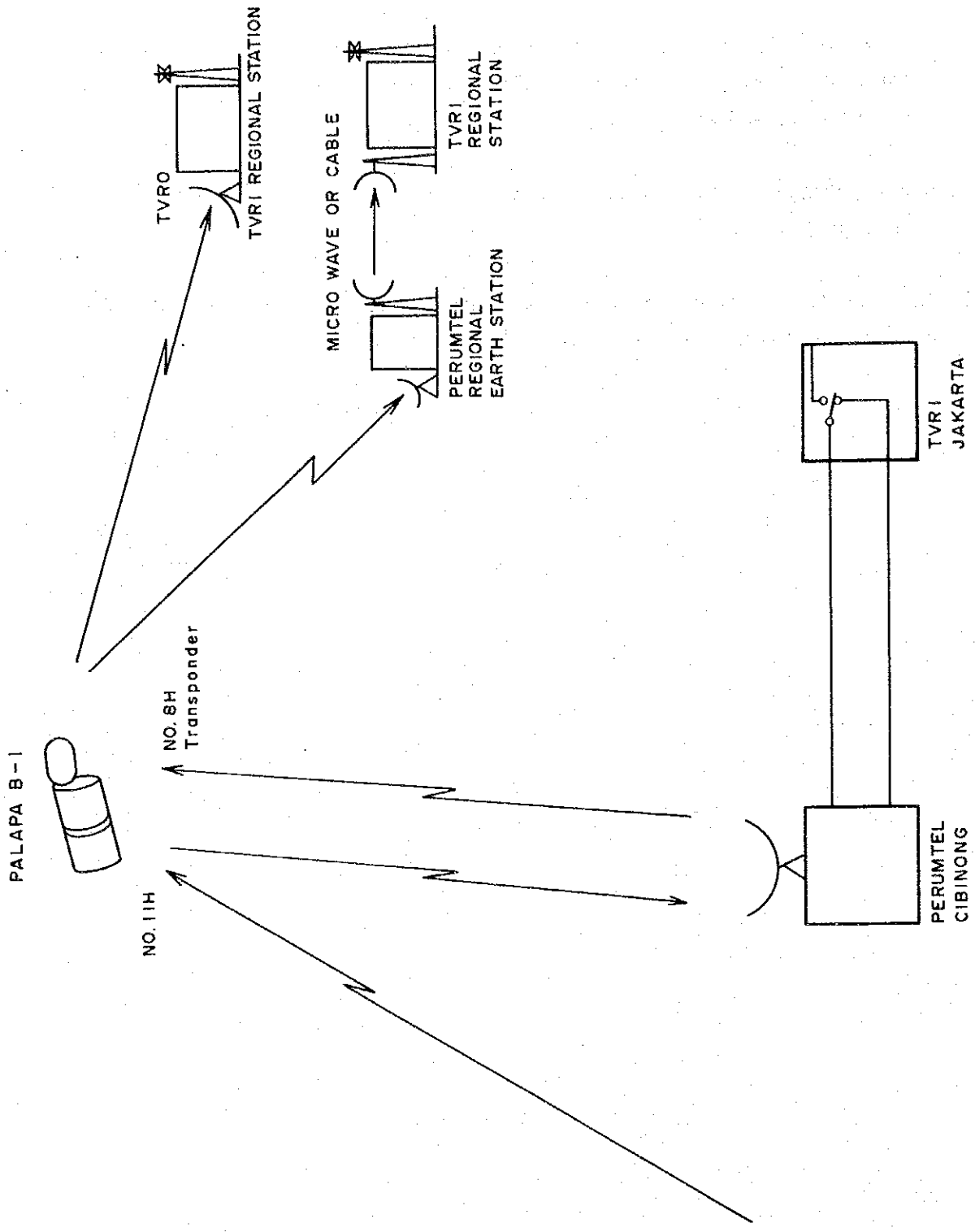
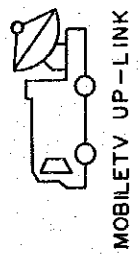


Fig. 2 - 4 - 1 NETWORK CONCEPT



2-5 Improvement of Radio Programme Transmission Line and Engineering Communication Network

2-5-1 Outline of the Present Conditions

(1) Radio Programme Transmission Line

1) RN-I

This is composed of PERUMTEL's one voice grade (3.4kHz bandwidth) channel from Jakarta to 40 RRI regional stations through each PERUMTEL regional earth station.

Regarding the remaining 8 stations, it is composed of shortwave off-air relay from Ujung Pandang, Biak and other stations.

2) RN-II and RN-III

These are not established.

3) Overseas

This is composed of PERUMTEL's one voice grade (3.4kHz bandwidth) channel from Jakarta to Medan station through PERUMTEL Medan earth station.

(2) Engineering Communication Network

It has not yet been improved into an exclusive network.

TVRI and RRI have recovered SSB telecommunication and ordinary subscriber telephone as the Engineering Communication Network.

2-5-2 Scope of Works

(1) Items

Following items shall be improved;

1) RN-I downstream programme transmission line from Jakarta to 48 RRI regional stations with 10kHz bandwidth.

2) RN-II downstream programme transmission line from Jakarta to Ujung Pandang RRI station with 5kHz bandwidth.

- 3) Overseas downstream programme transmission line from Jakarta to Medan and Biak RRI stations with 5kHz bandwidth.
- 4) RN-III Stereophonic programme transmission line from Jakarta to 6 RRI stations with 15kHz bandwidth.
- 5) Two duplex-type engineering communication lines among Jakarta and 48 RRI regional stations with facsimile equipment.
- 6) Two duplex-type engineering communication lines among Jakarta and 50 TVRI regional stations with facsimile equipment.

(2) Site

1) RRI: All stations

2) TVRI: Jakarta, Medan, Bengkulu, Sibolga, B.Aceh, Pekanbaru, T.J.Pinang, Padang, Bukittinggi, Jambi, Palembang, T.J.Karang, Yogyakarta, Bandung, Cirebon, Bogor, Semarang, Purwokerto, Surakarta, Surabaya, Malang, Madiun, Jember, Sumenep, Denpasar, Singaraja, Banjarmasin, Pontianak, Palangkaraya, Samarinda, Ujung Pandang, Palu, Kendari, Gorontalo, Manado, Kupang, Mataram, Dili, Jayapura, Ambon, Ternate, Sorong, Fak-Fak, Manokwari, Biak, Serui, Nabire, Wamena, Merauke, Balikpapan, Rengat

3) PERUMTEL: Cibinong MCS Ground Station

(3) Works

1) Network Concept

(a) Transponder to be Used

3MHz bandwidth of a transponder of the Palapa satellite will be used exclusively for radio programme transmission and engineering communication network.

(b) Transmissions between RRI Jakarta and Cibinong MCS station
The transmission route will be changed because wide-bandwidth transmission and stereophonic transmission cannot be conducted through the existing transmission route.

A both-way microwave link will be newly established between RRI Jakarta and TVRI Jakarta, so that the signals may be multiplexed at TVRI with the communication line for TV services and transmitted on to Cibinong.

Between TVRI and Cibinong, the existing microwave route will be used.

(c) Cibinong MCS Ground Station

A terminal facilities will be newly constructed in order to multiplex four radio-programme signals and four both-way communication lines (two each for TV and Radio) for transmission to the Palapa satellite. (In case the existing facilities are found to be usable for this purpose, such a facilities will be remodelled instead of constructing a new facilities.)

(d) Regional RRI Stations

At each of the regional RRI stations, a VSAT (Very Small Aperture Terminal) device will be set up for direct reception of transmissions from the Palapa satellite. This VSAT device shall be a unit accommodating two both-way communication lines and with a function added to send out and receive facsimile messages. Meanwhile, the demodulation function at each station for radio programmes shall be as follows:

- Medan Capable of demodulating the RN-I, RN-III and the Overseas programmes.
- Biak Capable of demodulating the RN-I and the Overseas programmes.
- Surabaya, Yogyakarta, Semarang, Banjarmasin and Bandung Capable of demodulating the RN-I and RN-III programmes.

- 40 Other Stations Capable of demodulating the RN-I programmes.

(e) Regional TVRI Stations

At each of the 50 regional TVRI stations, two both-way communication lines and a VSAT facility possessing functions to send out and receive facsimiles will be established.

Fig. 2-5-1 shows the network concept to be improved.

2-5-3 Effects

The following effects can be expected by the implementation of this project:

(1) Programme Transmission Line

- 1) Direct reception of signals from the Palapa satellite will eliminate the need of putting the signals through the route between the regional PERUMTEL and regional RRI, the route which used to pose the biggest problem, and will mean the formation of a high-quality line unaffected by such interferences as hum noise and crosstalks.
- 2) Because the RN-I programmes are transmitted through the programme transmission line with a bandwidth of 3.4kHz, the ratio between the national programmes and the locally-produced programmes is 20%:80%, which shows that RRI is heavily dependent on locally-produced programmes. However, the implementation of this project will enable transmission in high quality of the music programmes produced in Jakarta, resulting in diversification of the contents of the RN-I programmes and in enhancement of hopes for further improvement in the quality of programmes.
- 3) The new construction of a transmission line for RN-II programmes will enable the conducting of educational broadcasts nationwide from Ujung Pandang.

- 4) Construction and improvement of lines for Overseas programmes will enable the conveying of information to the Indonesians overseas from Medan and Biak and will, at the same time, contribute to the promotion of the world's knowledge and understanding about Indonesia.
- 5) As for the newly-constructed stations, too, lines can easily be composed by simply setting up a VSAT device.
- 6) Establishment of an FM stereophonic transmission line will enable the starting of three domestic programme services.

(2) Engineering Communication Network

- 1) It becomes possible to exclusively use on a 24-hour basis a communication line free of outside interference. As a result, it becomes possible to conduct speedily and smoothly all such activities as the maintenance work, programme operation, communications about programming, material-gathering and sending of scripts in both "spoken and written words."
- 2) The leasing of PERUMTEL lines on an exclusive basis will result in a reduction in the amount of the rental.

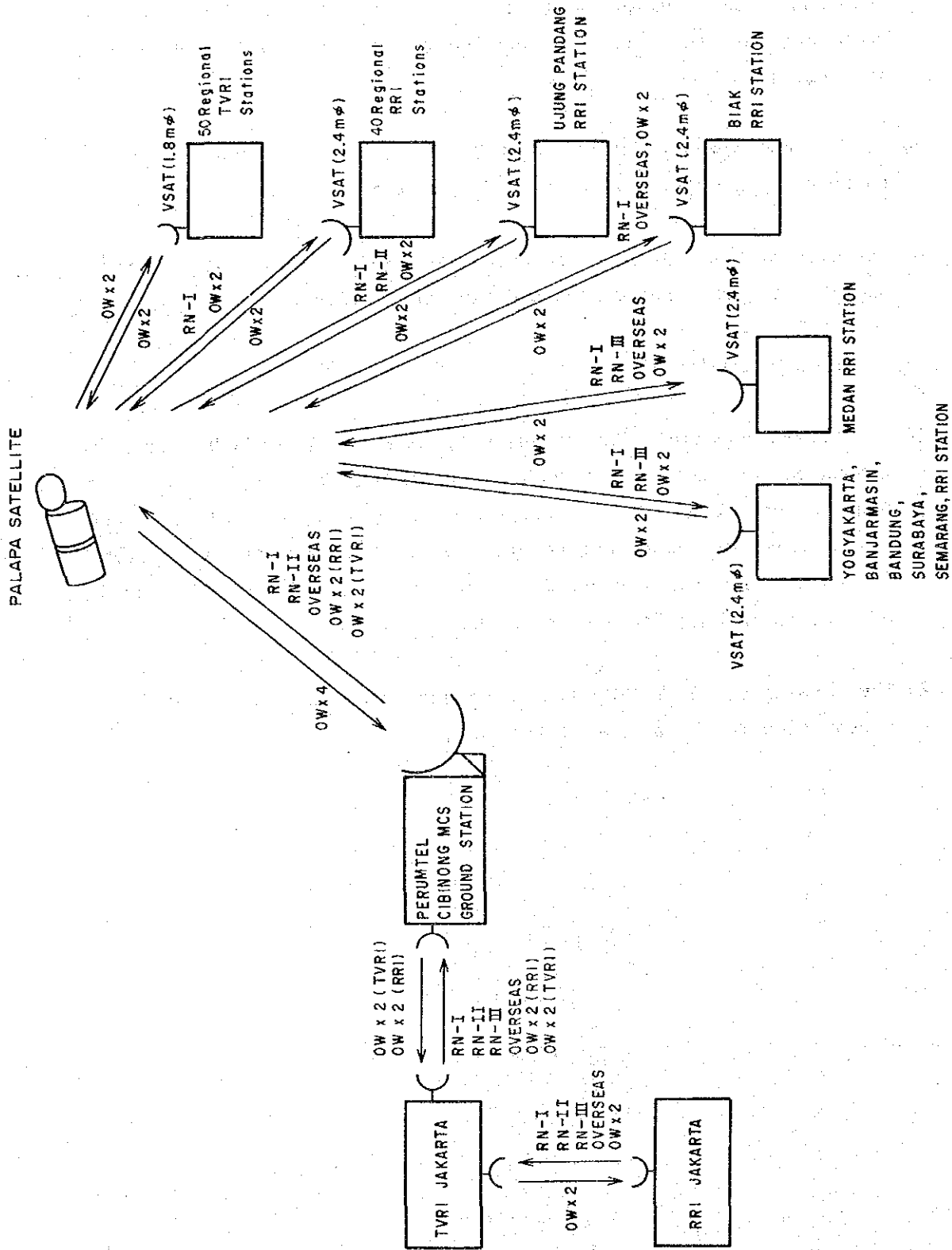


Fig. 2-5-1 NETWORK CONCEPT

2-6 Additional Construction of Medium-wave Transmission Facilities at Shortwave-only Broadcasting Stations

2-6-1 Examination on the Possibility of Installing Medium-wave Transmission Facilities

The stations at which medium-wave transmission facilities should be installed during the period of the fifth 5-year development plan shall be the following five; Bukittinggi, Palangkaraya, Fak-Fak, Sorong and Ternate. The current conditions of the sites at these five stations are as follows:

(1) Bukittinggi

1) Existing Site

- (a) Space for installation of a medium-wave transmitter : Cannot be installed in the existing transmitter room.
A station building can be newly constructed on the existing premises.
- (b) Transmitting antenna : Cannot be erected on the existing premises.
- (c) Power source : Good, but there is the need of increasing power-receiving capacity.
- (d) Access road : Good
- (e) Land : Not yet acquired but there is a plot of vacant land of about 160m×140m adjacent to the existing station premises and there is the possibility of acquiring this plot.

2) New site: None has yet been proposed.

(2) Palangkaraya

1) Existing Site

- (a) Space for installation of a medium-wave transmitter : Cannot be installed in the existing transmitter room. A station building can be newly constructed on the existing premises.
- (b) Transmitting antenna : Can be erected on the existing premises.
- (c) Power source : Good, but boosting of power-receiving capacity is necessary.
- (d) Access road : Good
- (e) Land : Impossible to acquire a plot adjacent to the existing premises.

2) New site: There is a site proposed.

There is one possible site at two different locations; one (Marang) located at a distance of about 24km to the northwest from the center of the town and the other (Banturung) located at a distance of about 31km to the same direction from the center of the town. Both of the two possible sites are under the same conditions as mentioned below, excepting the item (c). However, from the point of view of transmitting output and that of access road, the site 24km from the town center (Marang) appears to be better.

- (a) Land : Not yet acquired, but there is the possibility of acquiring a plot of land with an area of about 10ha (300m×350m).

(b) Power source : None at present.
So, until the receiving of power becomes possible in future (yet unknown), any transmitter installed will need to be operated with self-generated power.

(c) Access road : The site 24km away from the town center faces a 4~5m wide road, but in the case of the other site which is 31km away from the town center, there is the need of mending an access road of about 2km from the above-mentioned road.

(3) Fak-Fak

1) Existing Site

- (a) Space for installation of a medium-wave transmitter : Cannot be installed in the existing transmitter room.
- (b) Transmitting antenna : Cannot be erected on the existing premises.
- (c) Power source : Good
- (d) Access road : Good
- (e) Land : The adjacent plot cannot be acquired.

2) New site: There is a site proposed.

- (a) Land : Not yet acquired but there is the possibility of acquiring a plot

with an area of about 10ha (300m×350m). The plot is near the airport.

(b) Power source : None. Until the receiving of power becomes possible in the future (yet unknown), any transmitter installed will need to be operated with self-generated power.

(4) Sorong

1) Existing Site

(a) Space for installation of a medium-wave transmitter : Can be installed in the existing transmitter room.

(b) Transmitting antenna : Cannot be erected on the existing premises.

(c) Power source : Good

(d) Access road : Good

(e) Land : The adjacent plot cannot be acquired.

2) New site: There is a site proposed.

(a) Land : Not yet acquired but there is the possibility of acquiring a plot with an area of about 10ha (300m×350m).

(b) Power source : None. Until the receiving of power becomes possible in the future (yet unknown), any transmitter installed

will need to be operated with self-generated power.

(5) Ternate

1) Existing Site

- (a) Space for installation of a medium-wave transmitter : Can be installed in the existing transmitter room.
- (b) Transmitting antenna : Can be installed on the existing premises (however, radial earth would be inadequate).
- (c) Receiving of power : Good
- (d) Access road : Good
- (e) Land : Not yet acquired, but there is a prospect for acquisition of an adjacent plot. (Acquisition will be necessary in order to install adequate earth.)

2) New site: There is no site proposed.

2-6-2 Outline of Installation of Medium-wave Transmission Facilities

Required Medium-wave transmission facilities to be installed at the station are as follows:

- (1) Medium-wave transmitters
- (2) Transmitting antenna system

- (3) STL (transmission of programmes between the studio and the transmitting station)
- (4) Power-source system
- (5) Others (such as spare parts and measuring instruments)

In addition to the above, a station building and necessary pieces of land will be required.

As for Palangkaraya and Ternate, two different plans are proposed; one in which the facilities are to be installed on the existing site and the other in which the facilities are to be installed on a new site (including a site adjacent to the existing one). The facilities (1) to (5) listed above are to be procured with the foreign portion of the budget, while the construction of the new station building and the acquisition of the land will be carried out with the local portion of the budget.

Table 2-6-1 shows the outline of the installation at each station.

Fig. 2-6-1~Fig. 2-6-6 show the layout of the premises of the transmitting station at each broadcasting station.

2-6-3 Effects

Each of the broadcasting stations mentioned above owns 2~4 units of shortwave transmitters with an output of 300W~10kW and is using each of these transmitters at different hours of the day to transmit the programmes according to the broadcasting schedules. As a result, the listeners living in the periphery of the service area find themselves in a situation where they can hear the broadcasts well at certain hours of the day but are unable to receive the broadcasts properly at other hours. In fact, the current service is so inadequate that little can be said to refute the charge that the service totally ignores the interest of the listeners. Moreover, especially during the night time, the broadcasts are additionally made difficult to listen to by the interference from broadcasts coming from distant regions, the phenomenon characteristic of shortwave propagation. Thus, it is an inevitable fact that shortwave is inferior to medium-wave when it comes to the stability of reception. To make the matters worse, the shortwave transmitters currently in use have

been considerably superannuated and the majority of them are already up for replacement. In view of such circumstances as mentioned above, it seems to be quite certain that installing of the newest type of transmitters—the medium-wave transmitters—will enable offering stable and high-quality broadcasting services to the residents of both the city and peripheral areas alike, both night and day and regardless of the hour of the day, with constant output.

Such measures as proposed above can be expected not only to help establish a favorable broadcast-reception environment but also to contribute greatly to the reinforcement of the broadcasting organization's support of the national development plans in response to the Government's wishes and expectations, as well as to the fostering of sound-minded and well-informed Indonesian people.

The total estimated population within the service area of the five broadcasting stations is approximately 800,000, after installation of the medium-wave transmitters as proposed.

Table 2-6-1 Outline of Transmission Facilities

Item	Station Name	Bukitringgi	Palangkaraya (Plan-1)	Palangkaraya (Plan-2)	Fakfak	Sorong	Ternate (Plan-1)	Ternate (Plan-2)
Frequency used (kHz)		1,512kHz	1,197kHz	1,197kHz	774kHz	909kHz	891kHz	891kHz
Transmission Output (kW)		10kW	5kW	5kW	10kW	10kW	10kW	10kW
1. Transmission Device		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
(1) Solid-state Transmitter (standby system)		10kW 1 set	5kW 1 set	Same as left	10kW 1 set	10kW 1 set	10kW 1 set	Same as left
(2) Other auxiliary units (PIE, Dummy, switcher, etc.)		10kW 1 set	5kW 1 set	Same as left	10kW 1 set	10kW 1 set	10kW 1 set	Same as left
2. Transmitting antenna device		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
(1) Base insulation guyed system (incl. obstruction light)		H=33m 1 set	H=63m 1 set	Same as left	H=97m 1 set	H=82m 1 set	H=84m 1 set	Same as left
(2) Radial earth		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
(3) Feeders (incl. ATU hut and ATU) (aerial)		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
3. STL device (VHF, FM)*1		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
(1) Transmitter-receiver (Transmitter: solid-state 100W) (Standby system) Receiver: Solid-state		1 set each	1 set each	Same as left	1 set each	1 set each	1 set each	Same as left
(2) Antenna (For transmission: 4-ring For reception: Yagi)		1 set each	1 set each	Same as left	1 set each	1 set each	1 set each	Same as left
(3) Steel tower (For transmission: 40m) (Self-supporting) For reception: 30m		1 set each	1 set each	Same as left	1 set each	1 set each	1 set each	Same as left
4. Power-source device		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
(1) Power reception/distribution device		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
(2) AVR		1 set	1 set	—	—	—	1 set	Same as left
(3) Engine Generator device (incl. control panel, fuel tank, etc.)		1 set	1 set	2 sets	2 sets	2 sets	1 set	Same as left
5. Others (Spare parts, measuring instruments, peripheral units, etc.)		1 set	1 set	Same as left	1 set	1 set	1 set	Same as left
6. Station building		1	1	1 each of Transmitter house Engine-generator house	1 each of Transmitter house Engine-generator house	1 each of Transmitter house Engine-generator house	Existing building to be used	Existing building to be used
7. land		Acquisition of an adjacent plot of 160m x 140m is required	Existing plot of land to be used	Acquisition of 300m x 350m = 10ha. required	Acquisition of 300m x 350m = 10ha. required	Acquisition of 300m x 350m = 10ha. required	Acquisition of adjacent 60,000m ² required	Existing plot of land to be used

*1 Transmission also serves as FM broadcast.

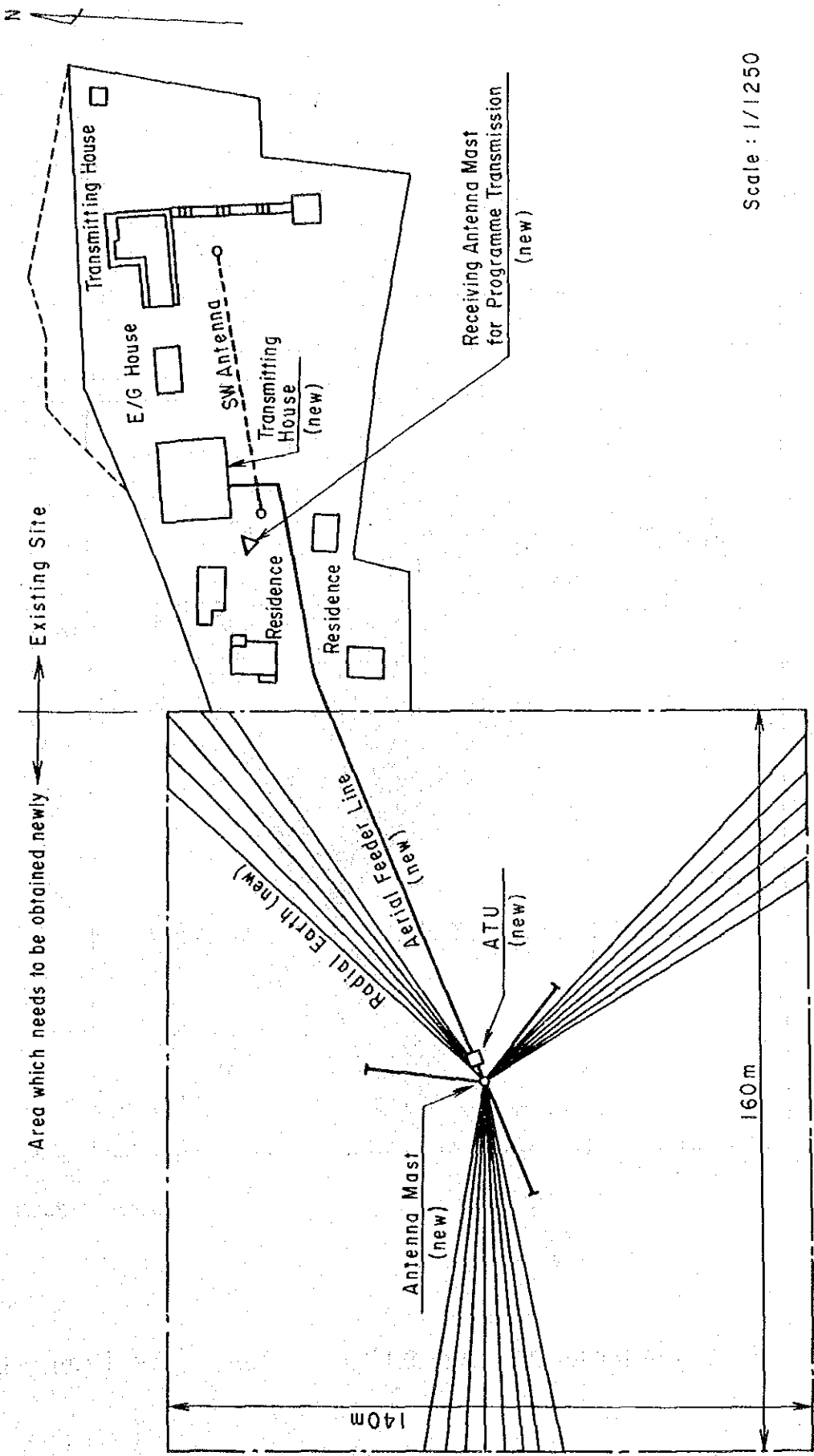
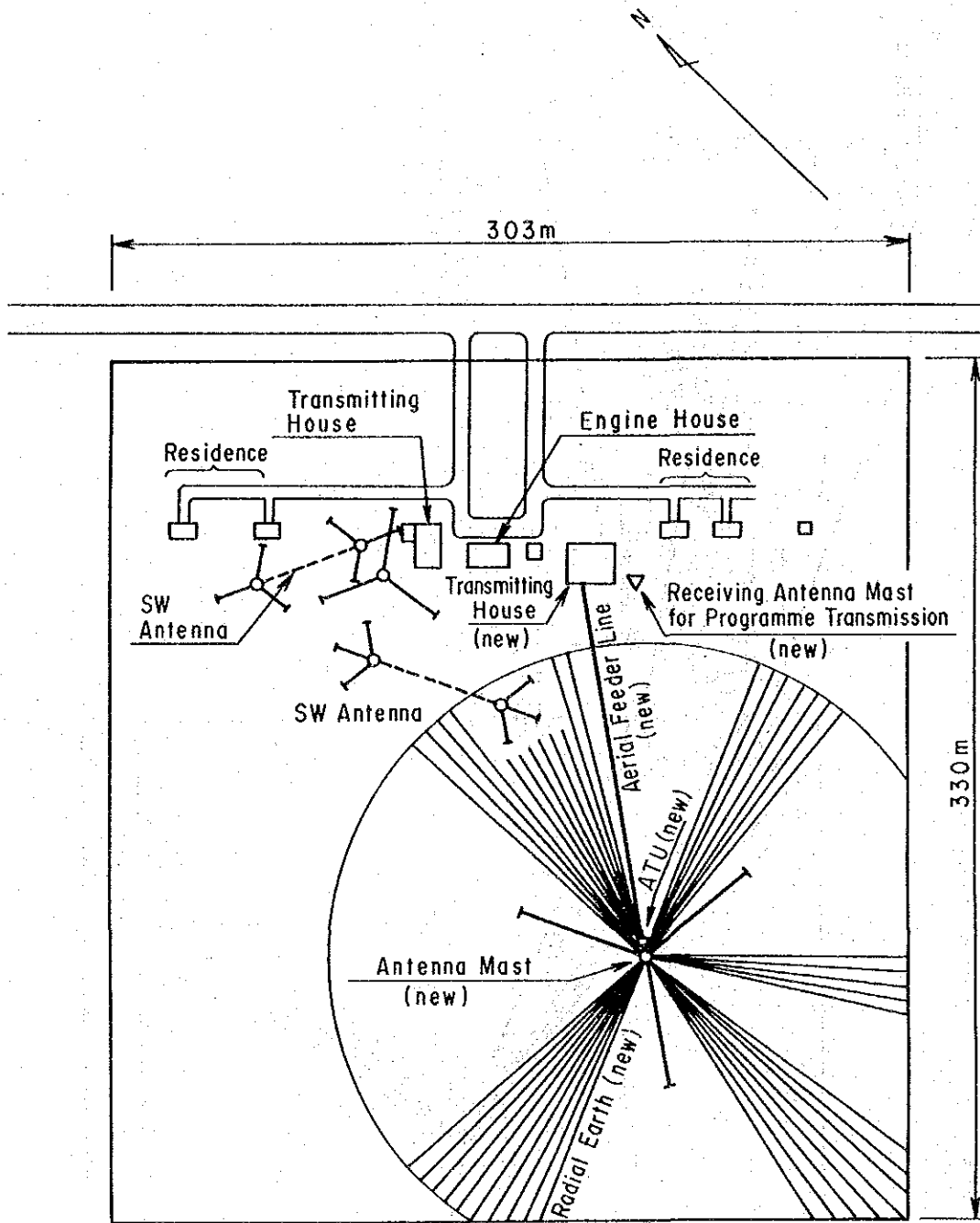
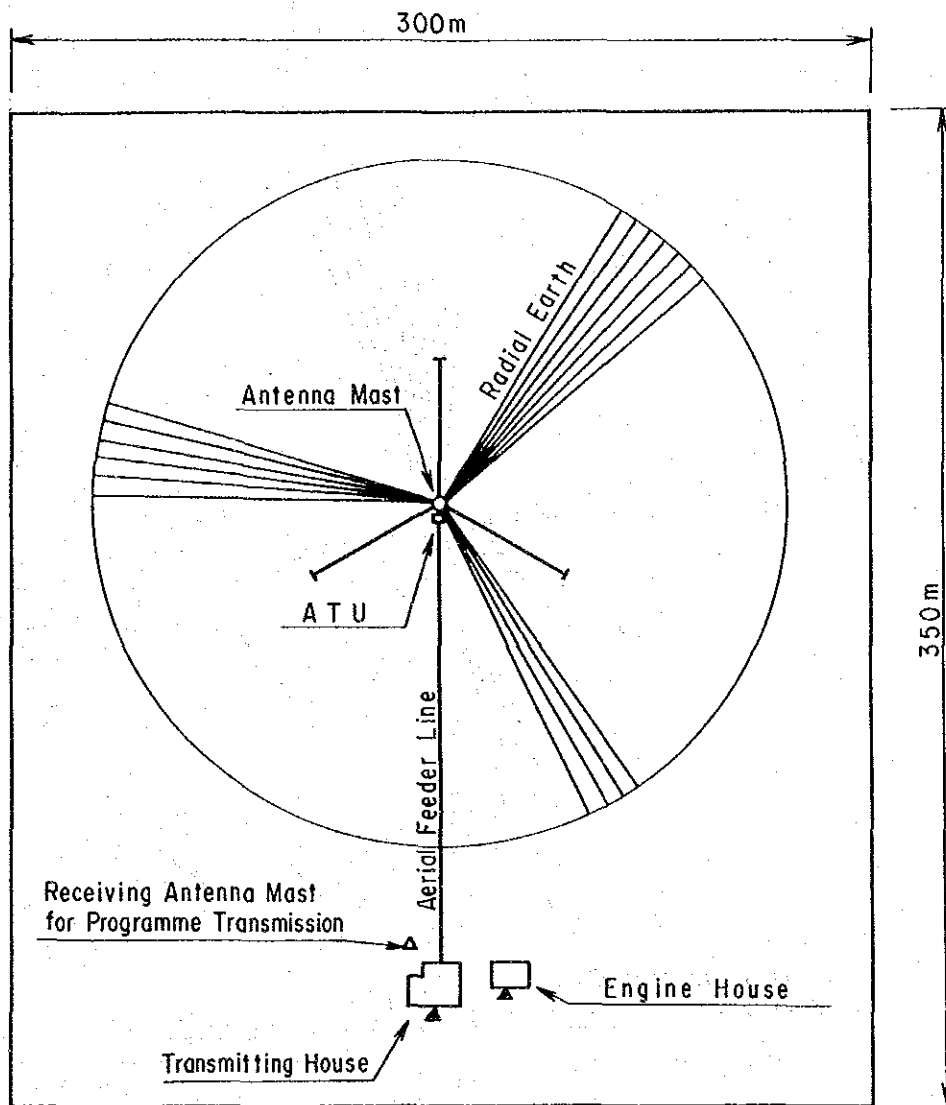


Fig. 2-6-1 Bukittinggi Transmitting Station ; Site Plan



Scale : 1/2500

Fig. 2-6-2 Palangkaraya Transmitting Station ; Site Plan - I



Scale : 1/2500

Fig. 2-6-3 Palangkaraya Transmitting Station ; Site Plan - 2
(New Site)

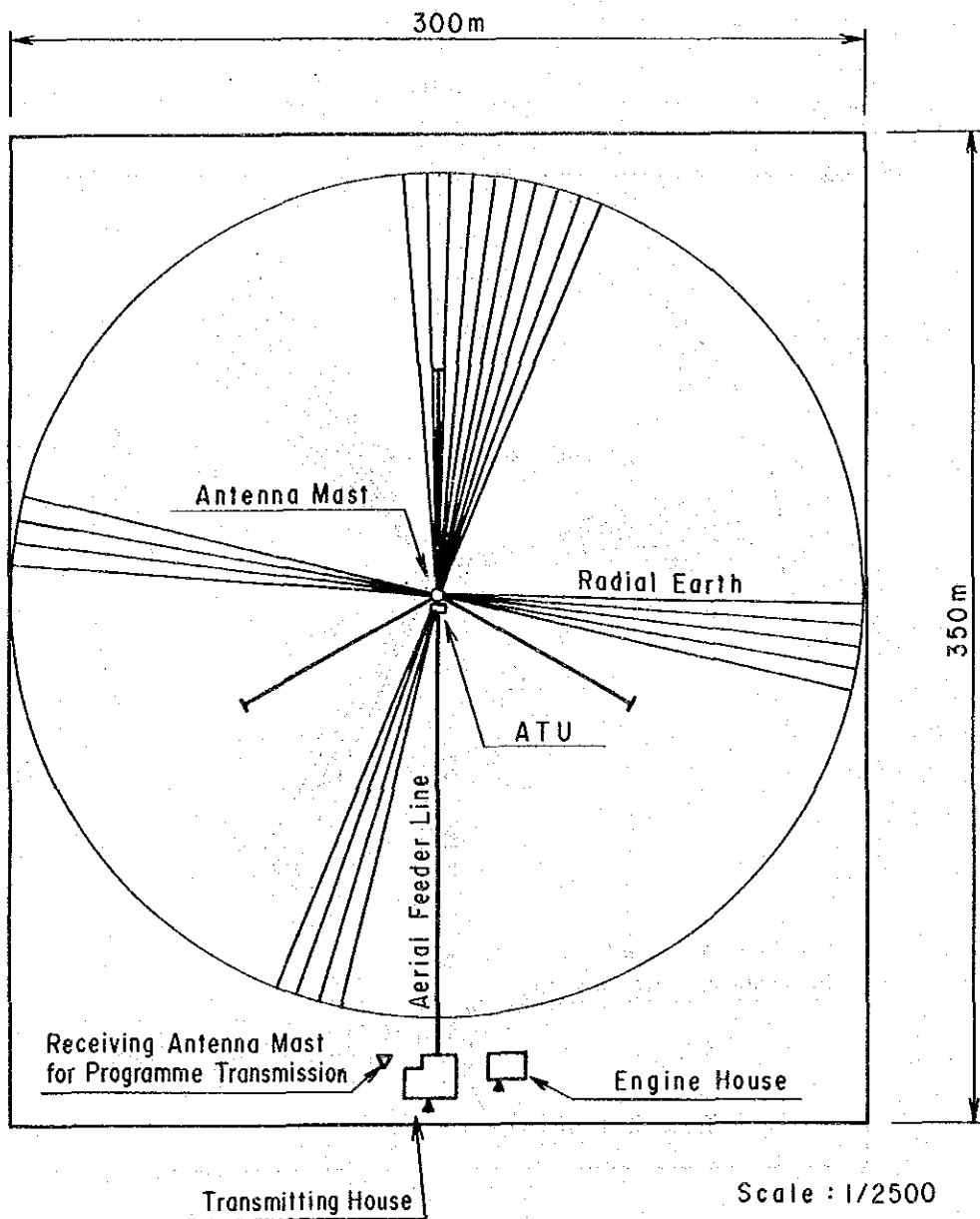


Fig. 2-6-4 Fakfak Sorong Transmitting Station ; Site Plan (New Site)

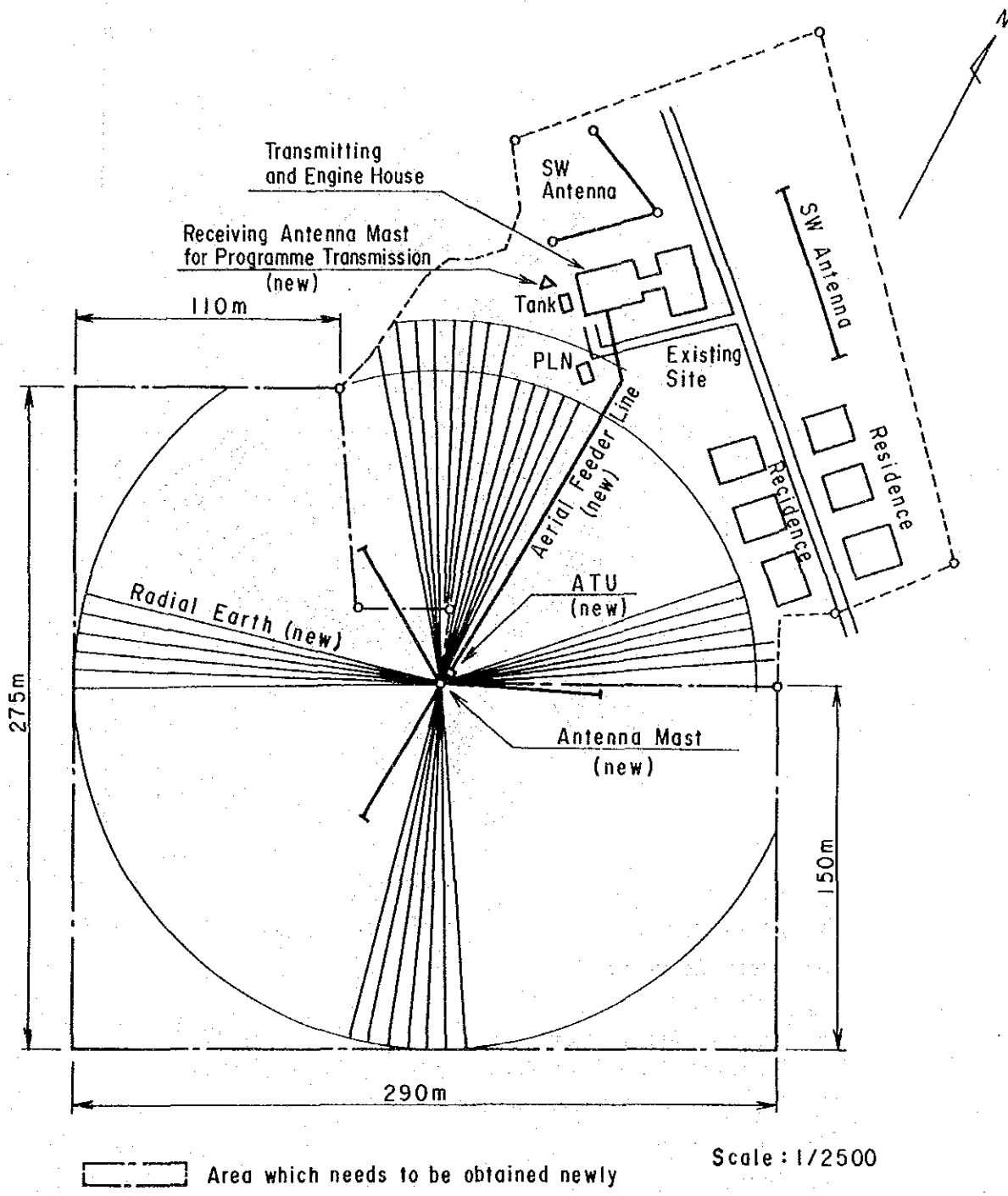
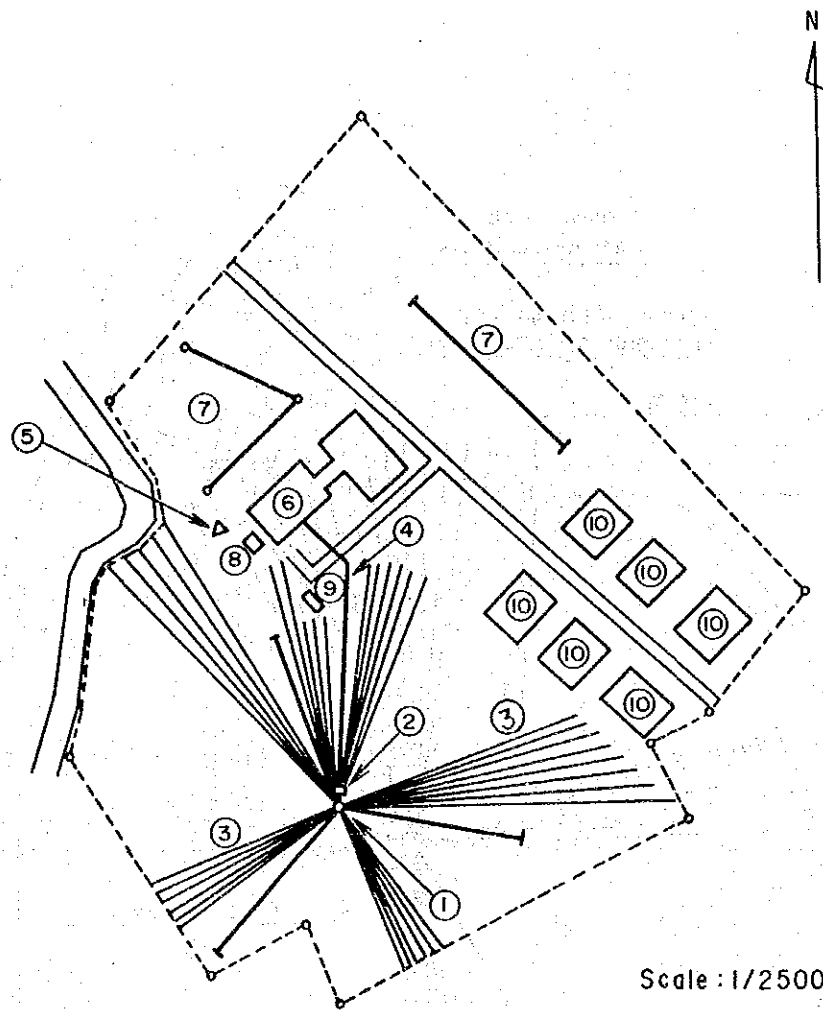


Fig.2-6-5 Ternate Transmitting Station ; Site Plan - I



- | | |
|---|-------------|
| ① Antenna Mast (new) | ⑨ PLN |
| ② ATU (new) | ⑩ Residence |
| ③ Radial Earth (new) | |
| ④ Aerial Feeder Line (new) | |
| ⑤ Receiving Antenna Mast for Programme Transmission (new) | |
| ⑥ Transmitting and Engine House | |
| ⑦ S.W. Antenna | |
| ⑧ Tank | |

Fig.2-6-6 Ternate Transmitting Station ; Site Plan -2

2-7 Rehabilitation of Studios at Regional Radio Stations

2-7-1 Outline of Existing Facilities

The outline of the existing facilities of four (4) radio studios of the shortwave-only stations are as follows.

(1) Bukittinggi

1) Master control

- Audio Distribution
 - Amplifier : 1 set
- Patch Board : 1 set
- Receiver : 2 sets
- Monitor Speaker : 1 set

2) Studio 1

- Audio Mixer : 1 set (10 ch)
- Disc Reproducer : 2 sets
- Open Reel Tape Recorder : 2 sets
- Cassette Tape Recorder : 2 sets

3) Announcer's Booth

- Audio Mixer : 1 set (4 ch)
- Disc Reproducer : 1 set
- Open Reel Tape Recorder : nil
- Cassette Tape Recorder : 2 sets

4) Recording Studio

- Audio Mixer : 1 set (10 ch)
- Disc Reproducer : 1 set
- Open Reel Tape Recorder : 1 set
- Cassette Tape Recorder : 3 sets

5) FM Transmitter (STL)

- FM 1 : 50 W, 93 MHz
- FM 2 : 50 W, 97.6 MHz

- 6) STL Tower
• Height : 22 m (erected on the roof of the studio building)

(2) Fak-Fak

1) Master Control

- Audio Distribution Amplifier : 1 set
- Patch Board : 1 set
- Receiver : 2 sets
- Monitor Speaker : 1 set

2) Studio (large)

- Audio Mixer : 1 set (10 ch)
- Disc Reproducer : nil
- Open Reel Tape Recorder : 2 sets
- Cassette Tape Recorder : 1 set

3) Studio (small)

- Audio Mixer : 1 set (4 ch)
- Disc Reproducer : nil
- Open Reel Tape Recorder : nil
- Cassette Tape Recorder : 1 set

4) FM Transmitter (STL)

- FM 1 : 50W, 93.3 MHz

5) STL Tower

- Height : 20 m

(3) Sorong

1) Master Control

- Audio Distribution Amplifier : 1 set
- Patch Board : 1 set
- Receiver : out of order

• Monitor Speaker : out of order

2) Studio 1

• Audio Mixer : 1 set (6 ch)
• Disc Reproducer : nil
• Open Reel Tape Recorder : nil
• Cassette Tape Recorder : 1 set

3) Studio 2

• Audio Mixer : 1 set (8 ch)
• Disc Reproducer : nil
• Open Reel Tape Recorder : nil
• Cassette Tape Recorder : 1 set

4) Studio 3

• Audio Mixer : 1 set (10 ch)
• Disc Reproducer : nil
• Open Reel Tape Recorder : 1 set
• Cassette Tape Recorder : nil

5) FM Transmitter (STL)

• FM 1 : 50W, 97 MHz, out of order
• FM 2 : 50W, 102 MHz

6) STL Tower

• Height : 35 m

(4) Ternate

1) Master Control

• Audio Distribution
Amplifier : 1 set
• Patch Board : 1 set
• Receiver : 2 sets
• Monitor Speaker : 1 set

2) Studio 1

• Audio Mixer : 1 set (10 ch)

- Disc Reproducer : 2 sets
 - Open Reel Tape Recorder : 2 sets
 - Cassette Tape Recorder : nil
- 3) Studio 2 : No equipment
- 4) Announcer's Booth
- Audio Mixer : 1 set (8 ch)
 - Disc Reproducer : 2 sets
 - Open Reel Tape Recorder : 1 set
 - Cassette Tape Recorder : 3 sets
- 5) FM Transmitter (STL)
- FM 1 : 50W, 102 MHz
 - FM 2 : 50W, 93.5 MHz
- 6) STL Tower
- Height : 35 m

2-7-2 Scope of Works

(1) Sites

The sites to be planned are as follows;

- 1) Bukittingi
- 2) Fak-Fak
- 3) Sorong
- 4) Ternate

(2) Works

The works to be implemented at the above sites are rehabilitation and upgrading of studios. The requirements are mentioned below.

1) Renewal

The equipment to be renewed at each site are shown in the Table 2-7-1 and a basic plan is shown in Fig. 2-7-1. All broadcasting equipment shall be stereophonic type.

(3) Local Side Works

The following local side works related to the above works shall be carried out on all sites.

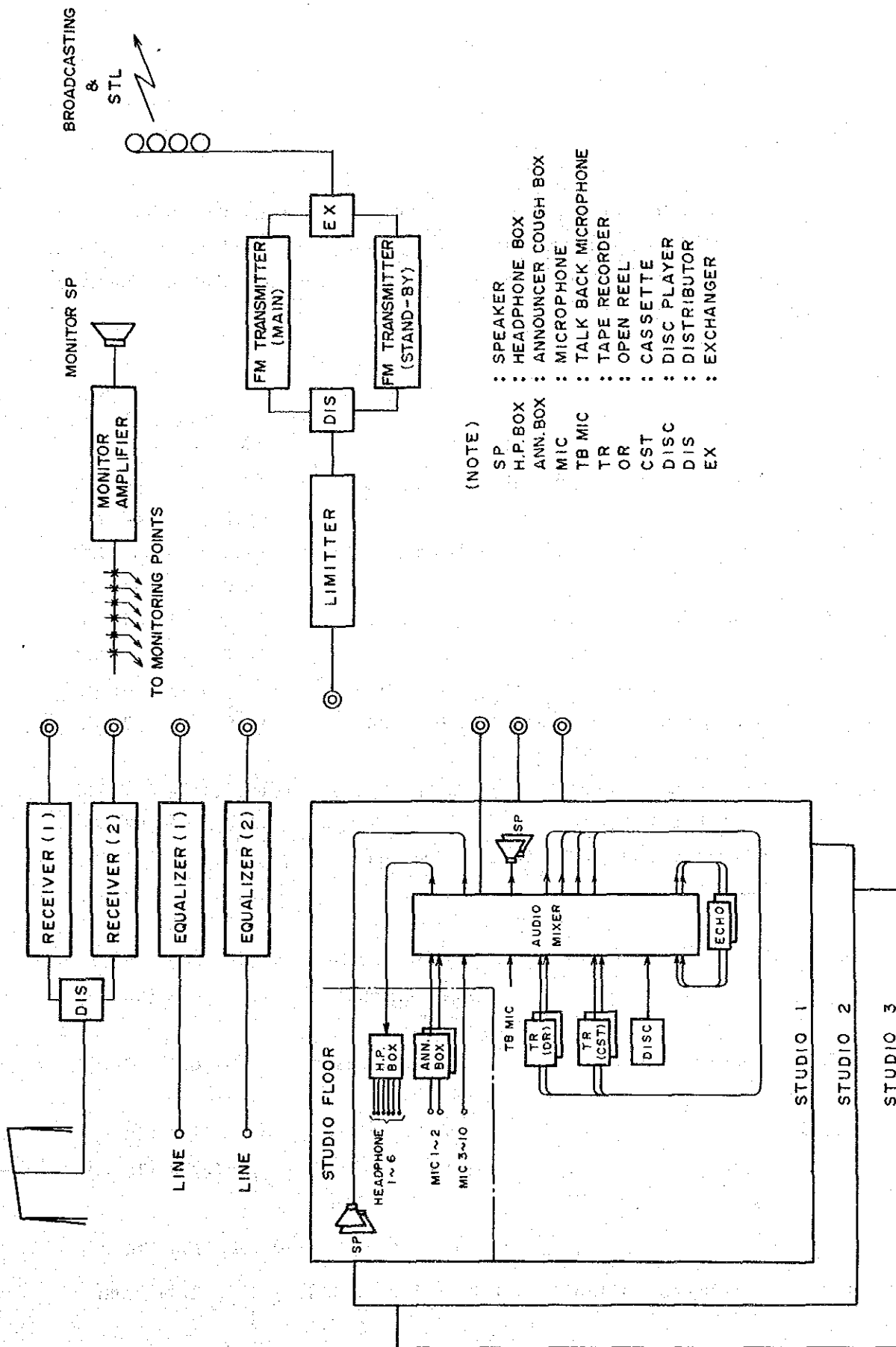
- Improvement of the interior of the studio
- Arrangement of an air conditioner for the studio
- Arrangement of necessary power supply
- Coordination

2-7-3 Effects

As the result of this project, it is expected that stable broadcasting and enhancement of the quality of programmes will be ensured.

Table 2-7-1 The Equipment to be renewed

Item	Station Name	Bukittinggi	Fak-Fak	Sorong	Ternate
1. Master Control Equipment					
• Master Rack		1 set	1 set	1 set	1 set
• Audio Amp., Limiter, Equalizer, etc.		1 set	1 set	1 set	1 set
• Patch Board		1 set	1 set	1 set	1 set
• Receiver		2 sets	2 sets	2 sets	2 sets
• Monitor		1 set	1 set	1 set	1 set
• VHF Transceiver with antenna		1 pair	1 pair	1 pair	1 pair
• Master clock		1 set	1 set	1 set	1 set
2. Studio Equipment					
• Audio Mixer: 8 ch		1 set for ANN. Booth	—	1 set for Studio 1	1 set for ANN. Booth
• 10 ch		1 set for Studio 1	1 set for Studio (small)	1 set for Studio 2	1 set for Studio 1
• 12 ch		1 set for Recording Studio	1 set for Studio (large)	1 set for Studio 3	1 set for Studio 2
• Open Reel Tape Recorder		6 sets (2 sets for each)	4 sets (2 sets for each)	6 sets (2 sets for each)	6 sets (2 sets for each)
• Cassette Tape Recorder		6 sets (2 sets for each)	4 sets (2 sets for each)	6 sets (2 sets for each)	6 sets (2 sets for each)
• Disc Reproducer		3 sets (1 set for each)	2 sets (1 set for each)	3 sets (1 set for each)	3 sets (1 set for each)
• Compact Disc Player		3 sets (1 set for each)	2 sets (1 set for each)	3 sets (1 set for each)	3 sets (1 set for each)
• Microphone		1 lot	1 lot	1 lot	1 lot
• Microphono stand		1 lot	1 lot	1 lot	1 lot
• Loudspeaker		12 sets (4 sets for each)	14 sets (4 sets for each and 6 sets for 3 ANN. Booths)	18 sets (6 sets for each)	12 sets (4 sets for each)
3. Measuring Equipment					
		1 set	1 set	1 set	1 set
4. Tools					
		1 set	1 set	1 set	1 set
5. Spare Parts					
		1 set	1 set	1 set	1 set
6. Maintenance Vehicle					
		1 set	1 set	1 set	1 set



(NOTE)

- SP : SPEAKER
- H.P. BOX : HEADPHONE BOX
- ANN. BOX : ANNOUNCER COUGH BOX
- MIC : MICROPHONE
- TB MIC : TALK BACK MICROPHONE
- TR : TAPE RECORDER
- OR : OPEN REEL
- CST : CASSETTE
- DISC : DISC PLAYER
- DIS : DISTRIBUTOR
- EX : EXCHANGER

Fig. 2-7-1 BASIC PLAN FOR RADIO STUDIO

CHAPTER 3 Implementation Plan

3-1 Project Cost

The required construction cost totals eight thousand forty-two point four (8,042.4) million yen for the foreign currency portion and seven thousand seven hundred and ninety-seven (7,797) million rupiah for the local currency portion.

3-1-1 Project

		UNIT (F.C. Th.¥) (L.C. Th.Rp)	
(1)	Rehabilitation of 8 High Power Radio Stations	(F.C.)	1,795,000
		(L.C.)	144,000
(2)	Rehabilitation of TV Transmitting Stations	(F.C.)	330,000
		(L.C.)	91,000
(3)	Establishment of a Maintenance System	(F.C.)	1,681,000
		(L.C.)	1,295,000
(4)	Improvement of Programme Transmission Line Engineering Communication Network and Introduction of TV Up-Links	(F.C.)	1,200,400
		(L.C.)	292,000
(5)	Additional Construction of MW Facilities at SW-Only Stations	(F.C.)	2,014,000
		(L.C.)	5,503,000
(6)	Rehabilitation of Studios at Regional Radio Stations	(F.C.)	615,000
		(L.C.)	472,000
Subtotal		Foreign Currency	7,635,400 (Th.¥)
		Local Currency	7,797,000 (Th.Rp)
(7)	Consultant Fee	Foreign Currency	407,000 (Th.¥)
Total		(F.C.)	8,042,400 (Th.¥)
		(L.C.)	7,797,000 (Th.Rp)

1 ¥ = 12.4 (Rp)

107,522,760 (Th.Rp)

The breakdown is shown in Tables 3-1-1, 3-1-2, 3-1-3, 3-1-4, 3-1-5 and 3-1-6.

Table 3-1-1 Construction Cost for Rehabilitation of 8 High Power Radio Stations

Item	Station Name	Jakarta	Medan	Surabaya	Pekanbaru	Palembang	Banjarmasin	U. Pandang	Semarang	Total
1. Renewal										
a. Parts and Materials										
• Transmitter	180,000	50,000	50,000	40,000	40,000	40,000	40,000	50,000	30,000	450,000
• Antenna System	10,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	45,000
• Power Supply System	10,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	3,000	43,000
b. Spare Parts	100,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	15,000	235,000
c. Working and Readjustment Fee	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	680,000
2. Repairs										
a. Materials	7,000	7,000	8,000	7,000	7,000	8,000	7,000	8,000	6,000	58,000
b. Working Fee	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	120,000
3. Cleanup										
a. Materials	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	8,000
b. Working Fee	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	8,000
Subtotal	409,000	189,000	190,000	179,000	179,000	180,000	179,000	190,000	161,000	1,647,000
4. Contingency (7%)	29,000	13,000	13,000	13,000	13,000	13,000	13,000	13,000	11,000	118,000
Total (Thousand Yen)	438,000	202,000	203,000	192,000	192,000	193,000	192,000	203,000	172,000	1,795,000
5. Local Side Work (Thousand Rupiah)										
• Coordination Fee	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	144,000

Table 3-1-2 Construction Cost for Rehabilitation of TV Transmitting Station

Item	Station Name	Medan	Ujung Pandang	Gn. Mangkol	Gn. Tajam	Gn. Muncung	Total
1. Renewal of Transmitter							
a. Equipment and Materials	30,000	20,000	20,000	20,000	20,000	20,000	110,000
b. Spare Parts	2,000	1,000	1,000	1,000	1,000	1,000	6,000
c. Working Fee	17,000	15,000	9,000	9,000	9,000	9,000	59,000
2. Setting up of Transmitter							
a. Equipment and Materials	—	—	20,000	20,000	—	20,000	40,000
b. Spare Parts	—	—	1,000	1,000	—	1,000	2,000
c. Working Fee	—	—	9,000	9,000	—	9,000	18,000
3. Overhaul of Antenna							
a. Materials	3,000	2,000	8,000	2,000	2,000	2,000	17,000
b. Working Fee	7,000	7,000	7,000	7,000	7,000	7,000	35,000
4. Renewal of Engine Generator							
a. Equipment and Materials	—	—	—	—	9,000	—	9,000
b. Spare Parts	—	—	—	—	1,000	—	1,000
c. Working Fee	—	—	—	—	4,000	—	4,000
5. Shifting of TVRO							
a. Materials	—	—	—	—	—	5,000	5,000
b. Working Fee	—	—	—	—	—	3,000	3,000
Subtotal	59,000	45,000	75,000	53,000	53,000	77,000	309,000
6. Contingency (7%)	4,000	3,000	5,000	4,000	4,000	5,000	21,000
Total (Thousand Yen)	63,000	48,000	80,000	57,000	57,000	82,000	330,000
7. Local Side Work(Thousand Rupia)							
• Coordination Fee	18,000	18,000	18,000	18,000	18,000	18,000	90,000
• Repairing of Building	—	—	—	1,000	—	—	1,000

Table 3-1-3 Construction Cost for Establishment of Maintenance System

Item	Station Name	EC Jakarta HQ Maintenance Base	Regional EC Medan Maintenance Base	Regional EC Ujung Pandang Maintenance Base	RRI Regional Station 18 Stations	TVRI Regional Station (Studio & MPU) 15 Stations	TVRI Regional Station (TX only) 9 Stations	Total
1. Measuring Equipment		113,000	54,000	54,000	92,000	255,000	27,000	59,500
2. Substitutive Equipment		180,000	73,000	73,000				326,000
3. Management Facility (Included CPU System and Communication Facility)		41,000	13,000	13,000				67,000
4. Working Facility (Tool and Other Facilities)		32,000	19,500	19,500				71,000
5. Spare Parts		480,000						480,000
6. Working Fee		15,000	8,500	8,500				32,000
Subtotal		861,000	168,000	168,000	92,000	255,000	27,000	1,571,000
7. Contingency		60,000	12,000	12,000	6,000	18,000	2,000	110,000
Total		921,000	180,000	180,000	98,000	273,000	29,000	1,681,000
8. Local Side Work (Thousand Rupia)								
• Building Construction Cost		900,000	170,000	25,000				1,095,000
• Building Facilities		160,000	20,000	20,000				200,000
Total		1,060,000	190,000	45,000				1,295,000

Table 3-1-4 Construction Cost for Improvement of Programme Transmission Line and Engineering Communication Link

	Cibinong	TVRI (48 Stations)	RRI (40 Stations)	RRI Ujung Pandang	RRI Medan	RRI Biak	RRI (5 Stations)	TVRI Medan	TVRI Surabaya	PRI Jakarta ~Cibinong	Total
1. UP/DOWN LINK EQUIPMENT	130,000	—	—	—	—	—	—	—	—	—	130,000
2. 1.8Ø VSAT	—	129,600	—	—	—	—	—	2,700	2,700	—	135,000
3. 2.4Ø VSAT (RN-I)	—	—	268,000	—	—	—	—	—	—	—	268,000
4. 2.4Ø VSAT (RN-I, RN-II)	—	—	—	6,700	—	—	—	—	—	—	6,700
5. 2.4Ø VSAT (RN-I, OVERSEAS)	—	—	—	—	—	6,700	—	—	—	—	6,700
6. 2.4Ø VSAT (RN-I, RN-III)	—	—	—	—	—	—	33,500	—	—	—	33,500
7. 2.4Ø VSAT (RN-I, OVERSEAS, RN-III)	—	—	—	—	6,700	—	—	—	—	—	6,700
8. Mobile TV UP LINK	—	—	—	—	—	—	—	168,000	168,000	—	336,000
9. Micro Wave Equipment	—	—	—	—	—	—	—	—	—	100,000	100,000
10. Working Fee	25,000	24,000	20,000	500	800	500	4,000	3,000	3,000	20,000	100,800
Subtotal (Th.₹)	155,000	153,600	288,000	7,200	7,500	7,200	37,500	173,700	173,700	120,000	1,123,400
11. Contingency	10,000	10,000	20,000	1,000	1,000	1,000	2,000	12,000	12,000	80,000	77,000
Total (Thousand Yen)	165,000	163,600	308,000	8,200	8,200	8,200	39,500	185,700	185,700	128,000	1,200,400
12. Local Work (Thousand Rupiah)	48,000	96,000	80,000	2,000	2,000	2,000	10,000	2,000	2,000	48,000	292,000

Table 3-1-5 Construction Cost for Additional Construction of MW Facilities at SW-only Stations

Item	Station Name	Bukittinggi	Palangkaraya	Fak-Fak	Sorong	Ternate	Total
1. Transmitting Equipment		81,000	74,000	81,000	81,000	81,000	398,000
2. Transmitting Antenna		51,000	55,000	65,000	64,000	64,000	299,000
3. Programme Transmission Equipment		40,000	40,000	40,000	40,000	40,000	200,000
4. Power Supply Equipment		48,000	64,000	69,000	69,000	48,000	298,000
5. Measuring Equipment		16,000	16,000	16,000	16,000	16,000	80,000
6. Maintenance Tools		2,000	2,000	2,000	2,000	2,000	10,000
7. Installation Materials		20,000	20,000	20,000	20,000	20,000	100,000
8. Spare Parts		10,000	10,000	10,000	10,000	10,000	50,000
9. Working Fee		90,000	90,000	90,000	90,000	90,000	450,000
Subtotal		358,000	371,000	393,000	392,000	371,000	1,885,000
10. Contingency		25,000	25,000	27,000	27,000	25,000	129,000
Total (Thousand Yen)		383,000	396,000	420,000	419,000	396,000	2,014,000
11. Local Side Work (Thousand Rupiah)		1,236,000	1,137,000	1,319,000	1,211,000	600,000	5,503,000

Table 3-1-6 Construction Cost for Rehabilitation of Studios at Regional Radio Station

Item	Station Name	Bukittinggi	Fak-Fak	Sorong	Ternate	Total (Th.¥)
1.	Master Control Equipment	30,000	30,000	30,000	30,000	120,000
2.	Studio Equipment	72,000	55,000	78,000	72,000	277,000
3.	Measuring Equipment & Tools	3,000	3,000	3,000	3,000	12,000
4.	Installation Materials	3,000	2,000	3,000	3,000	11,000
5.	Spare Parts	9,000	9,000	9,000	9,000	36,000
6.	Working Fee	30,000	30,000	30,000	30,000	120,000
	Subtotal (Th.¥)	147,000	129,000	153,000	147,000	576,000
7.	Contingency	10,000	9,000	10,000	10,000	39,000
	Total (Thousand Yen)	157,000	138,000	163,000	157,000	615,000
8.	Local Side Work (Thousand Rupiah)					
	• Coordination Fee	18,000	18,000	18,000	18,000	72,000
	• Modification of Building	100,000	100,000	100,000	100,000	400,000

3-1-2 Consultant Fee

The consultancy fee is estimated according to the following items.

(1) Man Power

- Project Manager
- Management Consultant (in charge of software project)
- Broadcast Engineers
- Local Side Consultants

(2) Travelling Expenses

- Air Flight Fee
- Living Expenses

(3) Others

- Car Charge
- Communication Expenses
- Preparing of the drawing and documents
- etc.

3-2 Operation Cost

Major items of the increment of annual operation cost at the end of this project are estimated as follows.

(1) Programme Production Cost

TV broadcasting hours will increase 7 hours per day at the end of this project.

Although programme production costs are variable depending on the types of programmes, the average cost for programme production is estimated to be 510,000 Rp per hour.

Accordingly, the increment of programme production cost is calculated to be 1,300 mill. Rp.

(2) Facilities Maintenance and Repair Cost

This is the cost required for the inspection, adjustment, repairs, and replacement of parts in order to maintain the initial functions of the facilities throughout their service life. In view of past similar projects and based on the experience in Japan, this project estimates the annual maintenance and repair cost to be one percent of the following construction cost.

- 1) Rehabilitation of 8 HP Radio Stations
- 2) Rehabilitation of TV Transmitting Stations
- 3) Introduction of TV Up-links
- 4) Improvement of Radio Programme Transmission Line and Engineering Communication Network
- 5) Additional Construction of MW Facilities at SW-only stations
- 6) Rehabilitation of Studios at Regional Radio Stations

Accordingly, the increment of annual maintenance and repair cost is calculated to be 782 mill.Rp.

(3) Operation Cost for Improvement of a Maintenance System

Maintenance bases will be established at three locations viz., Jakarta, Medan, Ujung Pandang, by this project.

Operation cost in each maintenance base is composed of office expenses, maintenance work expenses, emergency expenses and so on. Accordingly, the annual operation cost for maintenance bases is calculated to be as follows.

1) Jakarta	: 2,500 mill.Rp
2) Medan	: 165 mill.Rp
3) Ujung Pandang	: 165 mill.Rp
<hr/>	
Total	2,830 mill.Rp

(4) Leasing Fee for Programme Transmission Line

It does not necessitate additional expenses on the Radio transmission line.

According to the introduction of TV Up-links, however, transponder leasing fee to transmit the programmes from regional stations to Jakarta will be increased.

The annual increment cost is calculated to be 30 mill.Rp in expectation of transmission of one hour programme per month.

(5) Electric Power Charge

Following items cause the increment of electric power charge.

- 1) Increment of TV Broadcasting Hours
- 2) Rehabilitation of 8HP Radio Stations
- 3) Additional Construction of MW Facilities at SW-only Stations

The increment of annual electric power charge is calculated to be 1,000 mill.Rp.

(6) Personal Wages

It will be necessary to increase 59 staff members for establishment of maintenance system.

The increment of annual personal wages are calculated to be 244 mill.Rp on the basis of annual average per capita income of 4,130,000 Rp at the Engineering Centre in 1989.

(7) Total Increment of Annual Operation Cost

1) Programme Production Cost	: 1,300 mill.Rp
2) Facilities Maintenance and Repair Cost	: 782 mill.Rp
3) Operation Cost for Improvement of a Maintenance System	: 2,830 mill.Rp
4) Leasing Fee for Programme Transmission Line	: 30 mill.Rp
5) Electric Power Charge	: 1,000 mill.Rp
6) Personal Wages	: 244 mill.Rp
<hr/>	
Total	6,186 mill.Rp

3-3 Implementation Schedule

As regards the Software Project, a typical implementation schedule is shown in Table 3-3-1. And for the Hardware Project, the proposed budgetary schedule is shown in Table 3-3-2 and a typical construction schedule is shown in Table 3-3-3.

Table 3-3-1 Typical Implementation Schedule of Software Project

Item	Repelita	Repelita V				Repelita VI			
	Year	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	
Implementation Schedule of Software Project									
1) Integration of RRI and TVRI									
- Preparation									
- Declaration & Approval of Documentation									}}
- Commencement in Operation									}}
- Further Alignment									}}
2) Other Schedule									
- Educational Programme (Committee)									}}
- News Gathering (Committee)									}}
- Audience Service (Committee)									}}
- Maintenance Base (Set up of Maintenance Division in EC)									}}
3) Improvement of Broadcasting Programme									
- RN- I									}}
- RN-III									}}
- Overseas Service									}}
- TVN- I									}}
- Metropolitan Service (Jakarta)									}}
(Reference)									
Implementation Schedule of Hardware Project									
1) On-going, Committed project and project under Planning by RTF									}}
2) Proposed Project by This Study									

Table 3-3-2 Budgetary Schedule

(F.C. Th. ¥)
(L.C. Th. Rp)

	1st Year	2nd Year	3rd Year
① Rehabilitation of 8 HP Radio Stations	Jakarta (F.C. 438,000) (L.C. 18,000)	Medan (F.C. 202,000) (L.C. 18,000)	Pekanbaru (F.C. 192,000) (L.C. 18,000)
	Semarang (F.C. 172,000) (L.C. 18,000)	Surabaya (F.C. 203,000) (L.C. 18,000)	Palembang (F.C. 193,000) (L.C. 18,000)
		U. Pandang (F.C. 203,000) (L.C. 18,000)	Banjarmasin (F.C. 192,000) (L.C. 18,000)
② Rehabilitation of TV Transmitting Stations	Medan (F.C. 63,000) (L.C. 18,000)	U. Pandang (F.C. 48,000) (L.C. 18,000)	Gn. Mangkol (F.C. 80,000) (L.C. 18,000)
			Gn. Tajam (F.C. 57,000) (L.C. 19,000)
			Gn. Muncung (F.C. 82,000) (L.C. 18,000)
③ Construction of a Maintenance System	Jakarta (F.C. 921,000) (L.C. 1,060,000)	Medan (F.C. 180,000) (L.C. 190,000)	RRI 18 Station (F.C. 98,000) (L.C. 0)
		U. Pandang (F.C. 180,000) (L.C. 45,000)	TVRI 15 Station (F.C. 273,000) (L.C. 0)
			TVRI 9 Station (F.C. 29,000) (L.C. 0)
④ Improvement of Programme Transmission Line, Engineering Communication Network and TV Up-Links	One set (F.C. 835,800) (L.C. 288,000)	TVRI Medan (TV Up-Link) (F.C. 182,300) (L.C. 2,000)	TVRI Surabaya (TV Up-Link) (F.C. 182,300) (L.C. 2,000)
	Palangkaraya (F.C. 396,000) (L.C. 1,137,000)	Bukittinggi (F.C. 383,000) (L.C. 1,236,000)	Fak-Fak (F.C. 420,000) (L.C. 1,319,000)
⑤ Additional Construction for MW Facilities at SW-only Stations		Ternate (F.C. 396,000) (L.C. 600,000)	Sorong (F.C. 419,000) (L.C. 1,211,000)
		Bukittinggi (F.C. 157,000) (L.C. 118,000)	Fak-Fak (F.C. 138,000) (L.C. 118,000)
⑥ Rehabilitation of Studios at Regional Radio Station		Ternate (F.C. 157,000) (L.C. 118,000)	Sorong (F.C. 163,000) (L.C. 118,000)
Subtotal	(F.C. 2,825,800) (L.C. 2,539,000)	(F.C. 2,291,300) (L.C. 2,381,000)	(F.C. 2,518,300) (L.C. 2,877,000)
Consultant Fee	(F.C. 141,000)	(F.C. 94,000)	(F.C. 172,000)
Total (Thousand Rupiah)	39,327,320	31,958,720	36,236,720
Ground Total	107,522,760 (Thousand Rupiah)		

Table 3-3-3 Typical Construction Schedule

Item	Year & Month	1st Year												2nd Year												3rd Year											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Consultant Contract		[Gantt bar from month 1 to 12]																																			
Detailed Survey		[Gantt bar from month 1 to 4]																																			
Detailed Design & Preparation of Tender Documents		[Gantt bar from month 4 to 10]																																			
Tender & Evaluation		[Gantt bar from month 10 to 16]																																			
Construction Contract		[Gantt bar from month 16 to 24]																																			
Manufacturing		[Gantt bar from month 16 to 24]																																			
Transportation		[Gantt bar from month 26 to 28]																																			
Installation Work		[Gantt bar from month 29 to 36]																																			
(1) Rehabilitation of High Power Radio Stations		[Gantt bars for Jakarta, Pekanbaru, Palembang, Banjarmasin, Medan, Surabaya, U. Pandang, Semarang]																																			
(2) Rehabilitation of TV Transmitting Stations		[Gantt bars for Medan, U. Pandang, Gr. Mangkol, Gn. Tajam, Gn. Muncung]																																			
(3) Establishment of Maintenance System		[Gantt bars for Jakarta, Medan, U. Pandang]																																			
(4) Introduction of TV Up-link and Improvement of Radio Programme Transmission Line and Engineering Communication Network		[Gantt bar for all sites]																																			
(5) Additional Construction of MW Facilities at SW-only Stations		[Gantt bars for Ternate, Sorong, Fak-fak, Bukittinggi, Palangkaraya]																																			
(6) Rehabilitation of Studios at Regional Radio Station		[Gantt bars for Ternate, Sorong, Fak-fak, Bukittinggi]																																			

CHAPTER 4 Economic Analysis

4-1 Evaluation Method

Preconditions for evaluation are the same as those in the Long-term Plan, but the evaluation method for the fifth 5-year development plan is as follows:

(1) Project-package evaluation

Economic analysis is conducted for the individual projects grouped according to the system.

(2) Evaluation indices

Benefit by the broadcasting service is generated through national networking. It is difficult to estimate the degree of benefit generated by individual facility. This means that the allocation rate of income to the individual facility cannot be estimated. Accordingly, financial evaluation is not made. Economic analysis only is conducted, which becomes evaluation indices.

(3) Allocation rate of radio and TV

The economic benefits for TV shall be regarded as those for the overall broadcasting, because the economic benefits for radio broadcasting cannot be estimated, as described in the Long-term Plan. As the benefit allocation ratio to radio, the present viewers fee rate of radio and TV (1:4) is applied.

(4) Benefit allocation ratio to engineering center

Since the engineering center is invested as facilities for the maintenance of radio and TV broadcasting services, benefits are allocated in the ratio of the investment amount in the engineering center's facilities to the total investment amount in facilities.

4-2 Economic Evaluation

EIRR for each project group obtained according to the above preconditions and method is as follows:

EIRR

1) Rehabilitation of 8 HP radio stations	: 40.6% (refer to Table 4-2-1.)
2) Rehabilitation of 5 TV stations	: 38.4% (refer to Table 4-2-2.)
3) Maintenance base	: 9.2% (refer to Table 4-2-3.)
4) Engineering communication network	: 16.8% (refer to Table 4-2-4.)
5) TV up-link	: 7.3% (refer to Table 4-2-5.)
6) Radio program line	: 7.9% (refer to Table 4-2-6.)
7) MW TX to SW station	: Δ 47.9% (refer to Table 4-2-7.)
8) Rehabilitation of radio studio	: Δ 2.7% (refer to Table 4-2-8.)
Total New Proposed Project	: 11.7% (refer to Table 4-2-9.)

[TABLE:4-2-1]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (REHABILITATION OF 8 HP RADIO STATIONS)
(PROJECT A . RRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	7,918	35	0	7,953	-7,953
1993	7,367	7,826	52	585	8,463	-1,096
1994	7,489	7,606	52	585	8,243	-753
1995	7,616	0	0	585	585	7,031
1996	7,746	0	0	585	585	7,161
1997	7,880	0	0	585	585	7,295
1998	8,018	0	0	585	585	7,433
1999	8,161			585	585	7,576
2000	8,308			585	585	7,723
2001	8,459			585	585	7,874
2002	8,616			585	585	8,031
2003	8,777			585	585	8,192
2004	8,943			585	585	8,358
2005	9,114			585	585	8,529
2006	9,290			585	585	8,705
2007	9,472			585	585	8,887
2008	9,660			585	585	9,075
2009	9,853			585	585	9,268
TOTAL	144,769	23,350	138	9,945	33,433	111,336

EIRR

40.61%

[TABLE:4-2-2]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (REHABILITATION OF 5 TV STATIONS)
(PROJECT B. TVRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	819	17	0	836	-836
1993	1,915	618	17	911	1,546	369
1994	1,947	2,890	53	911	3,854	-1,907
1995	1,980	0	0	911	911	1,069
1996	2,013	0	0	911	911	1,102
1997	2,048	0	0	911	911	1,137
1998	2,084	0	0	911	911	1,173
1999	2,121			911	911	1,210
2000	2,159			911	911	1,248
2001	2,199			911	911	1,288
2002	2,239			911	911	1,328
2003	2,281			911	911	1,370
2004	2,324			911	911	1,413
2005	2,369			911	911	1,458
2006	2,415			911	911	1,504
2007	2,462			911	911	1,551
2008	2,511			911	911	1,600
2009	2,561			911	911	1,650
TOTAL	37,629	4,327	87	15,487	19,901	17,728

EIRR

38.36%

[TABLE:4-2-3]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (MAINTENANCE BASES)
(PROJECT C. EC)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	12,001	1,018	0	13,019	-13,019
1993	5,066	4,642	226	2,988	7,856	-2,790
1994	5,150	5,270	0	2,996	8,266	-3,116
1995	5,237	0	0	3,005	3,005	2,232
1996	5,326	0	0	3,014	3,014	2,312
1997	5,418	0	0	3,022	3,022	2,396
1998	5,513	0	0	3,032	3,032	2,481
1999	5,611			3,041	3,041	2,570
2000	5,713			3,051	3,051	2,662
2001	5,817			3,061	3,061	2,756
2002	5,924			3,071	3,071	2,853
2003	6,035			3,082	3,082	2,953
2004	6,149			3,093	3,093	3,056
2005	6,267			3,104	3,104	3,163
2006	6,388			3,116	3,116	3,272
2007	6,513			3,128	3,128	3,385
2008	6,642			3,140	3,140	3,502
2009	6,775			3,153	3,153	3,622
TOTAL	99,543	21,913	1,243	52,097	75,253	24,290

EIRR

9.21%

[TABLE:4-2-4]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (ENGINEERING COMMUNICATION NET WORK)
(PROJECT D. TVRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	2,131	92	0	2,223	-2,223
1993	835	33	0	496	529	306
1994	849	33	0	496	529	320
1995	863	0	0	496	496	367
1996	878	0	0	496	496	382
1997	893	0	0	496	496	397
1998	909	0	0	496	496	413
1999	925			496	496	429
2000	942			496	496	446
2001	959			496	496	463
2002	976			496	496	480
2003	995			496	496	499
2004	1,013			496	496	517
2005	1,033			496	496	537
2006	1,053			496	496	557
2007	1,073			496	496	577
2008	1,095			496	496	599
2009	1,117			496	496	621
TOTAL	16,407	2,197	92	8,432	10,721	5,686

EIRR

16.79%

[TABLE:4-2-5]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (TV UP-LINK)
(PROJECT E. TVRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	2,355	2	0	2,357	-2,357
1994	492	2,410	2	51	2,463	-1,971
1995	500	0	0	51	51	449
1996	508	0	0	51	51	457
1997	517	0	0	51	51	466
1998	526	0	0	51	51	475
1999	536			51	51	485
2000	545			51	51	494
2001	555			51	51	504
2002	566			51	51	515
2003	576			51	51	525
2004	587			51	51	536
2005	598			51	51	547
2006	610			51	51	559
2007	622			51	51	571
2008	634			51	51	583
2009	647			51	51	596
TOTAL	9,020	4,765	4	816	5,585	3,435

EIRR

7.32%

[TABLE:4-2-6]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (RADIO PROGRAMME LINE)
(PROJECT F. RRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	8,645	184	0	8,829	-8,829
1993	930	0	0	83	83	847
1994	946	0	0	83	83	863
1995	962	0	0	83	83	879
1996	978	0	0	83	83	895
1997	995	0	0	83	83	912
1998	1,013	0	0	83	83	930
1999	1,031			83	83	948
2000	1,049			83	83	966
2001	1,068			83	83	985
2002	1,088			83	83	1,005
2003	1,108			83	83	1,025
2004	1,129			83	83	1,046
2005	1,151			83	83	1,068
2006	1,173			83	83	1,090
2007	1,196			83	83	1,113
2008	1,220			83	83	1,137
2009	1,244			83	83	1,161
TOTAL	18,282	8,645	184	1,411	10,240	8,042

EIRR

7.85%

(TABLE:4-2-7)

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (MW TX TO SW STATION)
(PROJECT G. RRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	5,291	1,092	0	6,383	-6,383
1993	614	10,095	1,379	804	12,278	-11,663
1994	624	11,213	2,429	804	14,446	-13,821
1995	635	0	0	804	804	-169
1996	646	0	0	804	804	-158
1997	657	0	0	804	804	-147
1998	669	0	0	804	804	-135
1999	680			804	804	-124
2000	693			804	804	-111
2001	705			804	804	-99
2002	718			804	804	-86
2003	732			804	804	-72
2004	746			804	804	-58
2005	760			804	804	-44
2006	775			804	804	-29
2007	790			804	804	-14
2008	805			804	804	1
2009	822			804	804	18
TOTAL	12,071	26,599	4,899	13,668	45,166	-33,095

EIRR -47.93%

[TABLE:4-2-8]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR (REHABILITATION OF RADIO STADIO)
(PROJECT K. RRI)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	4,050	227	0	4,277	-4,277
1994	430	3,980	227	75	4,282	-3,851
1995	437	0	0	75	75	362
1996	445	0	0	75	75	370
1997	453	0	0	75	75	378
1998	461	0	0	75	75	386
1999	469			75	75	394
2000	477			75	75	402
2001	486			75	75	411
2002	495			75	75	420
2003	504			75	75	429
2004	514			75	75	439
2005	523			75	75	448
2006	534			75	75	459
2007	544			75	75	469
2008	555			75	75	480
2009	566			75	75	491
TOTAL	7,892	8,030	453	1,200	9,683	-1,791

EIRR

-2.68%

[TABLE:4-2-9]

PROJECTED CASH FLOW FOR ECONOMIC ANALYSIS OF SHORT TERM PLAN
IN BROADCAST SECTOR
(TOTAL NEW PROPOSED PROJECT)

(UNIT: MILLION RP.)

Year	Incremental Economic Benefit	Investment (FC) Cost	Investment (LC) Cost	Incremental Economic Cost	Total Economic Cost	Net Benefit
1988	0	0	0	0	0	0
1989	0	0	0	0	0	0
1990	0	0	0	0	0	0
1991	0	0	0	0	0	0
1992	0	36,805	2,437	0	39,242	-39,242
1993	16,727	29,619	1,902	5,867	37,388	-20,661
1994	17,927	33,402	2,762	6,001	42,165	-24,238
1995	18,229	0	0	6,010	6,010	12,219
1996	18,540	0	0	6,019	6,019	12,521
1997	18,862	0	0	6,027	6,027	12,835
1998	19,193	0	0	6,037	6,037	13,156
1999	19,534	0	0	6,046	6,046	13,488
2000	19,886	0	0	6,056	6,056	13,830
2001	20,249	0	0	6,066	6,066	14,183
2002	20,623	0	0	6,076	6,076	14,547
2003	21,008	0	0	6,087	6,087	14,921
2004	21,405	0	0	6,098	6,098	15,307
2005	21,815	0	0	6,109	6,109	15,706
2006	22,237	0	0	6,121	6,121	16,116
2007	22,673	0	0	6,133	6,133	16,540
2008	23,122	0	0	6,145	6,145	16,977
2009	23,584	0	0	6,158	6,158	17,426
TOTAL	345,613	99,826	7,101	103,056	209,983	135,630

EIRR

11.72%

CHAPTER 5 Project Evaluation

Mass communication is serving basic functions that are indispensable for national development such as "conveyance of information to the people", "promotion of understanding among the people", "brewing of national consciousness", "increasing the understanding among the races" and "enhancement of international understanding". Not excepting in Indonesia, however, circulation of the print media such as newspapers and magazines is being faced with a great deal of difficulty by means of unsatisfactory literacy rate (62%) and insufficient means of distribution so that the print media are still inadequate for satisfying the needs of the vast land and the large population. (Newspaper circulation: number 89, circulation 750,000) Broadcasting is expected to produce excellent results among mass communications in consideration of efficiency.

Under the difficult situation facing Indonesia, the goals of "one nation, one language" has been the national imperative of the Republic of Indonesia ever since the independence. Broadcasting has made major contributions toward language unification. The total area of Indonesia is approximately 1,920,000km². In spite of the said vast land, Indonesia is making her efforts to unify and popularize "Bahasa Indonesia", and broadcasting is rendering services to the above work.

Indonesia is trying to make full use of broadcasting in order to make up for the lack of facilities and teachers in the fields of school education and such adult education as development of agriculture, forestry and fishery, dissemination of proper outlook on hygiene and health, promotion of family planning and promotion of the policy of transmigration.

The major objectives of this plan are recovery of the deteriorated functions of broadcasting in Indonesia and arrangement of the structure to maintain it, enhancing the quality of programmes, expanding a stable medium-wave broadcasting network and eventually achieving wholesome management and operation in broadcasting that focuses on audience servicing. At the same time, it is a plan to build up the reliable structure to carry out the future development plan from Repelita VII.

It is estimated that about 84 million people (about a half of the total population) are bestowed benefit directly by this improvement plan, and considering such software projects as improvement of the programme transmission line, establishment of a maintenance system, integration of the organizations, enhancing the quality of programmes and improvement of audience service, this plan is beneficial to all Indonesians.

The investment cost of the whole projects to achieve the plan totals 107.5 billion rupiahs, and as the total number of households is about 39,190 thousand, per-household project cost amounts to only about 2,743 rupiahs. It seems that this amount is not so large to enjoy good quality broadcasting.

As the main subject of this plan is rehabilitation, it is more economical plan than the project implemented newly for the similar effect. It is intended to utilize the facilities invested in the past effectively instead of procuring new equipment.

As shown above, the implementation of this plan will contribute to the operation and management of Indonesian broadcasting. It is desired strongly that this plan be executed smoothly.

PART III RECOMMENDATIONS

PART III RECOMMENDATIONS

As a result of the study which was conducted since September, 1989, the overall conclusion regarding the formulation of the fifth 5-year development plan and the future issues of the broadcasting services in Indonesia during Repelita V are summarized below.

CHAPTER 1 Recommendation on Software-aspects

1-1 Development Scale of Repelita V

In the investment plan including RTF's on-going projects, about 3/4 of the total budget will be invested in Repelita V. If this budget is not secured, projects planned in Repelita V will be slided into Repelita VI, i.e., the establishment of the servicing system will be delayed, which will affect the profitability of RTRI's enterprises. RTF should concentrate on securing the above budget, because the delay in the development of Pelita IV will influence Repelita V.

1-2 Organization and Operation

As a result of the study, recommendations are made on the numerous problems and items to be solved in connection with the organization and operation. DEPPEN and RTF will participate in directly tackling the above problems, and the other organizations are nothing but cooperating parties. Keeping this in mind, DEPPEN and RTF should concentrate their energies on the interaction.

New enterprises organized through the integration of RRI and TVRI will start the operation in the first year of Repelita VI. However, DEPPEN will declare the establishment of the new organization in 1993. For this, according to the laws and ordinances DEPPEN and RTF should take proper measures to accomplish the tasks assigned to broadcasting as a new organization.

Items recommended in this Study are utilized as one of issues to be examined for integration or for reference. It is desirable that further

examination for the integration is made by the committee that has been organized.

1-3 Study of TV License Fee

It is proposed in this Study that TV license fee which has been pegged since 1981 be increased to double the present level from 1991. Broadcasting acts as a means of information communication that contributes to maintaining and developing the national life and social economy, and also plays a vital role in education.

However, TV license fee shall be proper as public charges, and rational fee shall be set up.

License fee becomes a revenue source for the enterprises to expand and maintain service in response to the request of beneficiaries, while license fee becomes an expenditure for the beneficiaries.

In this way, the relationship between public charges and service is that between the contribution and inducement in the service provider and beneficiaries. Therefore, fee shall be determined according to the following principles.

- Cost-based principle
- Fair remuneration principle
- Fair principle to beneficiaries

It is proposed to realize these principles that a committee mainly consisting of RTF and TVRI be established to review the license fee. In parallel with this, it is desirable to heighten the people's will to pay fee by changing TV programmes and improving the payment system.

1-4 Broadcasting Programme

(1) Today, broadcasting must supply accurate and up-to-date news of Indonesia and the world. Therefore, 24-hour-a-day broadcasting organization must be conducted by 49 RRI stations of RN-I network.

At the same time, RRI and TVRI should establish a "liaison

coordination committee" for gathering news materials between local stations.

- (2) Systematic educational programmes should be organized through the utilization of open hours of the TVN-I network and metropolitan channel.

For the purpose of planning these educational programmes and setting up a related production system a "liaison coordination committee" will be formed by such bodies as TVRI, RRI, and the Ministry of Education and Culture.

- (3) TVRI and RRI should broadcast public campaigns relative to promotion of trade, agriculture, tourism, family planning, etc.
- (4) TVRI must make more Indonesian versions of foreign-made dramas by using new Japanese made dubbing system .

1-5 Appointment of the Management Consultant

It is recommended that a well experienced management consultant in the broadcasting field shall be appointed to ask useful advice on the following items for the smooth implementation of the Software Project.

(1) Integration of RRI and TVRI

1) Organizational Structure

- Fundamental Policy
- Functional Formation of Organizational Structure
- Work/Job Description of each Organizational Unit
- Assignment of Work to each Organizational Unit

2) Personnel Administration

- Fundamental Policy
- Organizational Requirement
- Evaluation of Staff Ability
- Staff Resource Development Plan
- Salary and Allowances Scheme, Adjustment between RRI and TVRI
- Integrated Retirement Plan

- Effective Use of Surplus Staff Member

3) Budgetary Considerations

- Fundamental Policy
- Integration of RRI and TVRI Budget
- Transient Procedures
- Integrated RRI and TVRI Accounts
- Settlement of Accounts
- Integrated Auditing

4) Integration of Fixed Assets of RRI and TVRI

- Management of Fixed Assets
- Assessment of Fixed Assets
- Depreciation System
- Combination with Technical Facilities Management System

5) Integration of Routine Business Operation at RRI/TVRI Jakarta Headquarters and Regional Stations

- Administration
- Programme Production
- Technical Operation/Maintenance

(2) Effective Collection of TV License Fees

1) Basic Policy

- Fundamental Concept of TV License Fees
- Establishment of Law/Regulation
- Organization/Department Responsible for TV License Fees

2) Promotion Campaign of Public Understanding in TV License Fees

- Promotion Campaign by DEPPEN/RTF
- Use of Broadcasting Media by RRI and TVRI
- Use of Printed Media (Newspaper, Periodicals and Magazines)

3) Establishment of TV License Fee Collection Systems

- Use of Fee Collectors (Direct Collection)
 - Recruitment
 - Training

- Routine Management/Supervision
- Effective Use of Surplus RRI and TVRI Staff
- Incentive Systems

For each Fee Collection

For New Subscription

- Use of Pos & Giro (Indirect Collection)
- Use of Bank Transfer (Indirect Collection)

4) Promotion of TV License Fee Payment

- Discount for Annual Payment
- Admission Ticket for Broadcasting Events
- Lottery

5) Promotion in TV License Fee Collection

- Awards for Fee Collectors
- National Fee Collectors Competition
- Competition among Pos & Giro
- Awards for Top Bank in Fee Transfer

6) Supervision of Subscribers

- Routine Check
- Procedures for TV License Fee who Refuse to Pay
- Lawsuite/Court Procedures

7) Subscriber Services

- Broadcast Programme Information by Newspaper, Periodicals and Magazines (Free of Charge or Paid)
- Technical Services
 - Subscriber Guidance for Good Signal Reception
 - Research/Analysis of Reception Condition of Radio and TV
 - Elimination of Interferences
 - Radio and TV Receiver Repair Service in Remote Area

(3) Management and Operation of Maintenance Centre

1) Organization

2) Personnel Planning/Administration

3) Routine Budget Planning/Compilation

- 4) Data Collection/Storage/Analysis for Facilities and Equipment Maintenance
 - 5) Storage and Inventory Control of Spare Parts/Modules
 - 6) Emergency Repair Work
 - 7) Training of Local Engineers/Technicians in Maintenance Work
 - Planning for Training
 - Training through Practice
 - Coordination with MMTC in Training Activities
 - 8) Technological Transfer through above Activities
- (4) Operation and Management of Liaison Coordination Committees for Broadcasting Programmes

CHAPTER 2 Recommendation on Hardware-aspect

It is proposed and recommended for RRI and TVRI to take suitable actions on the following items for obtaining excellent results of the proposed projects.

- (1) To set up a task force in the Engineering Centre in order to draw up technical standards.
- (2) To make studies on service area by means of questionnaires and field intensity check in order to confirm the conditions of listening to and watching on radio and TV, and make service area maps.
- (3) To execute active on-the-job training at each post.
- (4) To study ways of good communication between the Jakarta Headquarters and each regional station.
- (5) To establish clear-cut lines of authority and responsibility on the technical matters.
- (6) To study the studio occupation factor on programme production in order to come in useful for designing.
- (7) To study the problems on propagation (interference, fading, etc.) which occur recently.
- (8) To seize the conditions of facilities suitably and pigeonhole those data.

