

**OFFICE OF THE PRIME MINISTER  
THE UNITED REPUBLIC OF TANZANIA**

**BASIC DESIGN STUDY  
ON  
THE PROJECT FOR STRENGTHENING  
THE RADIO BROADCASTING FOR SCHOOL EDUCATION  
BY  
IMPROVING THE QUALITY OF EDUCATION  
AND  
PROMOTION OF EQUAL ACCESS TO EDUCATION  
IN  
THE UNITED REPUBLIC OF TANZANIA**

**MAY 2000**

**JAPAN INTERNATIONAL COOPERATION AGENCY  
NHK INTEGRATED TECHNOLOGY INC.**

## PREFACE

In response to a request from the Government of the United Republic of Tanzania, the Government of Japan decided to conduct a basic design study on the Project for Strengthening the Radio Broadcasting for School Education by Improving the Quality of Education and Promotion of Equal Access to Education in the United Republic of Tanzania and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Tanzania study teams from October 17 to October 22 and from November 8 to December 11, 1999.

The team held discussions with the officials concerned of the Government of Tanzania, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Tanzania in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the United Republic of Tanzania for their close cooperation extended to the teams.

May 2000



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Kimio Fujita

President

Japan International Cooperation Agency

May 2000

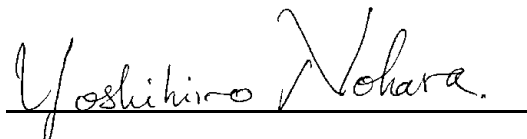
## Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Strengthening the Radio Broadcasting for School Education by Improving the Quality of Education and Promotion of Equal Access to Education in the United Republic of Tanzania.

This study was conducted by NHK Integrated Technology Inc, under a contract to JICA, during the period from November 11<sup>th</sup>, 1999 to June 9<sup>th</sup>, 2000. In conducting the study, we have examined the feasibility and rationale of project with due consideration to the present situation of the United Republic of Tanzania and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

A handwritten signature in black ink, reading "Yoshihiro Nohara", is written over a horizontal line.

Yoshihiro Nohara

Project Manager,

Basic design study team

on the Project

for Strengthening the Radio Broadcasting

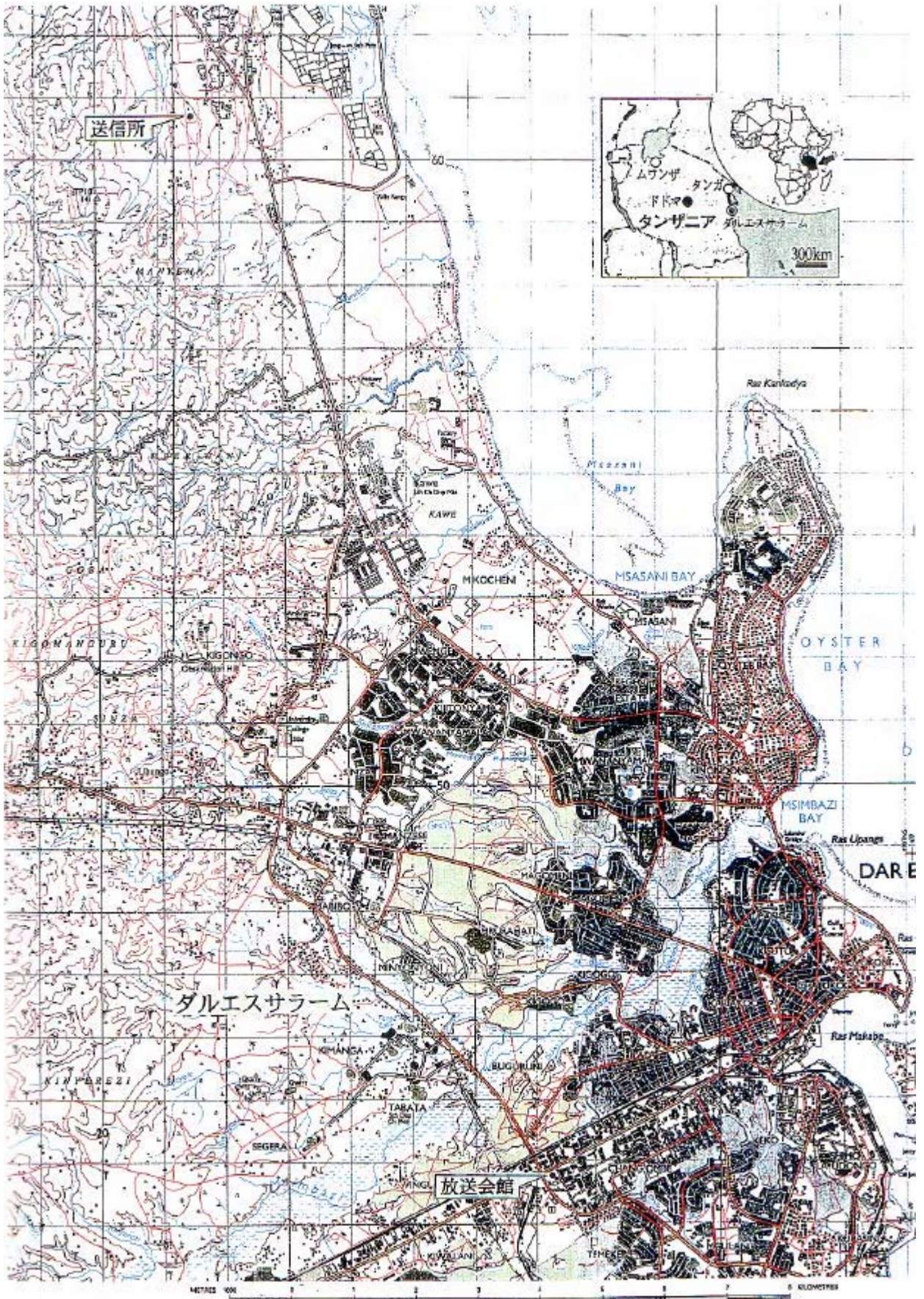
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by Improving the Quality of Education

and Promotion of Equal Access to Education

in the United Republic of Tanzania

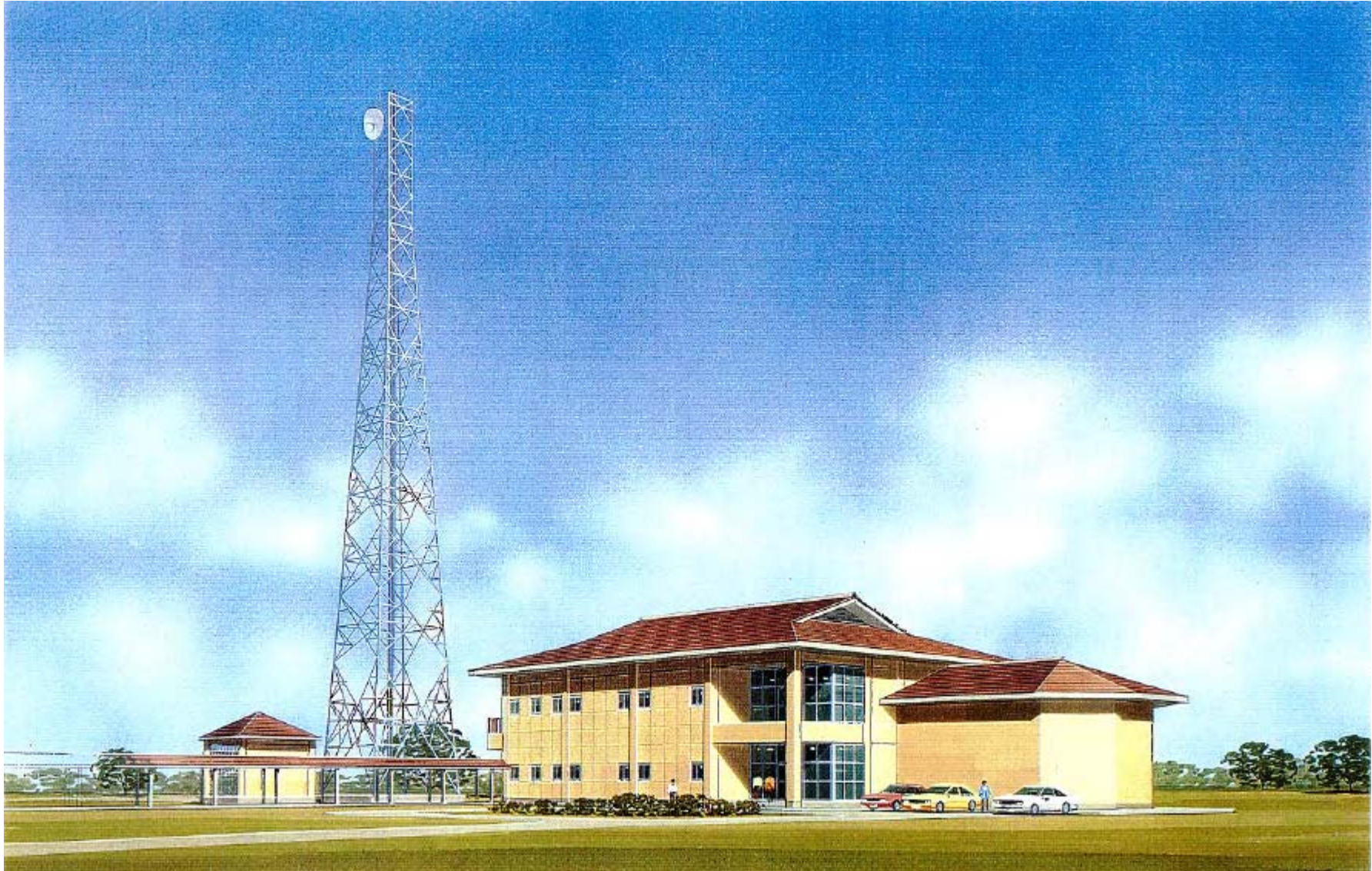
NHK Integrated Technology Inc.



PROJECT SITES



PERSPECTIVE OF KUNDUCHI NEW TRANSMITTING STATION



PERSPECTIVE OF RTD NEW STUDIO BLOCK

## ABBREVIATION LIST

ADA	Audio Distribution Amplifier
AMIX	Audio Mixer
ANT	Antenna
ATU	Antenna Tuning Unit
AUX	Auxiliary
AVR	Automatic Voltage Regulator
CCT	Compact Cassette Tape Recorder/Reproducer
CD	Compact Disk or Compact Disk Player
COS	Change Over Switch
DAT	Digital Audio Tape Recorder/Reproducer
DISK	Record Player
E/G	Engine Generator
EFF	Sound Effect Equipment
EQ	Line Equalizer
FU	Cough Box
GEQ	Graphic Equalizer
HF	High Frequency (Short Wave)
L/C	Limiter/Compressor
LB	Limiter
LM	Level Meter
MCR	Master Control Room
MD	Mini-Disc or Mini-Disc Recorder/Reproducer
MF	Medium Frequency
MIC	Microphone
ORT	Open Reel Tape Recorder/Reproducer
PA	Power Amplifier
PIE	Programme Input Equipment
PRT	Dar es Salaam FM Local Broadcasting (Powerful Reliability Trustworthy)
RX	Receiver
SPK	Speaker
ST	Studio
TP	Telephone Pick-Up
TX	Transmitter
UPS	Uninterrupted Power Supply
VU	Volume Unit Meter

# CONTENTS

Preface	
Letter of Transmittal	
Project Sites / Perspective	
Abbreviation	
<b>Chapter 1 Background of the request</b>	<b>1</b>
1-1 Radio broadcasting in Tanzania	1
1-2 Relations between RTD and the ministry agencies in various education and enlightenment activities	2
1-3 Contents of the request	9
<b>Chapter 2 Contents of the Project</b>	<b>11</b>
2-1 Objectives of the Project	11
2-2 Basic Concept of the Project	12
2-2-1 Study Result of the Project	12
2-2-2 Kunduchi Transmitting Station	15
2-2-3 RTD Broadcasting Centre	16
2-2-4 Programme Link Equipment	18
2-3 Basic Design	18
2-3-1 Design Concept	18
2-3-2 Basic Design	21
2-3-3 Basic Design Plan	71
<b>Chapter 3 Implementation Plan</b>	<b>111</b>
3-1 Implementation Plan	111
3-1-1 Implementation Concept	111
3-1-2 Implementation Conditions	113
3-1-3 Scope of Works	115
3-1-4 Consultant Supervision	117
3-1-5 Procurement Plan	120



3-1-6	Implementation Time Schedule .....	122
3-2	Operation and Maintenance Plan .....	125
<b>Chapter 4</b>	<b>The evaluation of the project and suggestion .....</b>	<b>131</b>
4-1	Authentication of the validity .....	131
4-1-1	Expected substantial effect.....	131
4-1-2	The present conditions and problems .....	134
4-2	Technical cooperation / Connection with other donors .....	138
4-3	Problems .....	140

## Appendices

1. Member List of the Survey Study
  - (1) Basic Design Team (Oct. 1999)
  - (2) Basic Design Study (Nov. 1999)
  - (3) Explanation of Draft Basic Design Study (Mar, 2000)
  
2. Survey Schedule
  - (1) Basic Design Study (Oct. 1999)
  - (2) Basic Design Study (Nov. 1999)
  - (3) Explanation of Draft Basic Design Study (Mar. 2000)
  
3. List of Party Concerned in the Recipient County
  
4. Minutes of Discussion
  - (1) Basic Design Study (Oct. 22, 1999)
  - (2) Basic Design Study (Nov. 19, 1999)
  - (3) Explanation of Draft Basic Design Study
  
5. Cost Estimation Borne the Recipient Country (Mar. 29,2000)
  
6. Reference

## **Chapter 1**

### **Background of the Project**

## **Chapter 1 Background of the request**

### **1-1 Radio broadcasting in Tanzania**

Radio Tanzania Dar es Salaam (RTD), the only national TV station, has progressed until today for half a century since Radio broadcasting was introduced in Tanzania in 1951, dealing mainly with the education enlightenment program.

Since then, RTD is continuing the broadcasting for the education / enlightenment in extensive fields keeping close relations with the concerning ministry agencies.

The role of RTD in the various educations and enlightenment activities today is;

- (1) To produce / record / edit program according to the syllabus gathered with a professional view of the ministry agencies, and
- (2) To broadcast them in the general service program with charges on countrywide network.

As for charging for the airtime, it is not that RTD was privatised. It was brought about in the stream of various policies for the financial reconstruction of Tanzanian government accepting the recommendation of IMF / the World Bank on '95. Collected charge will go to the Treasury and RTD is operated 100% by the government budget.

The school broadcasting of RTD had been carried out for 20 years, from 1970 to 1991, with textbooks issued from RTD, which are acceptable even today.

However, it has been stopped until today due to the failure of the economic policy of late 1980s.

From its natural conditions, abundant mineral resources and tourist resources, Tanzania has been already presumed as a very eminent country in Africa originally. However, its education and society reform was delayed due to the slow progress of the national consciousness in the background of its underdeveloped infrastructure. This restrains the economic development and the establishment of prosperity and welfare nation aimed by the Tanzanian government. Thus the importance of broadcasting is realized again for generalizing information / education and for improvement of efficiency in the vocational training. We assume that this made President Mkapa himself request the application of Japanese aid.

## **1-2 Relations between RTD and the ministry agencies in various education and enlightenment activities**

### **(1) Roles of the ministry agencies**

In The Rolling Plan and Forward Budget for Tanzania for the Period 1996/1997-1998/1999 (RPFB), Tanzanian government has placed the Social Service (the development of society) in the main position of the government activities and its emphasis is put on the National welfare.

The government believes that it is indispensable train able people to carry out this development of society. By fulfilling the education / enlightenment activities, the government is aiming not only at upraising competent peapole but also at building the society of high productivity by enhancing the knowledge of national health, sanitation etc. and the knowledge of agriculture which is the key industry of the country.

In each ministry agency, the activities through RTD General Service are being developed nationwide and occupies an important position in education / enlightenment activities on each field. There are following patterns of assignments between ministry agencies and RTD in broadcasting;

Materials recorded in the ministry agencies are edited / produced into programs in RTD.

Scenario is made in the ministry agencies, and recording / editing / producing is done by RTD.

Program in the stock of the ministry agencies are used.

The following is the example of the activities in the Ministry of Agriculture and the Ministry of Welfare.

#### Ministry of Agriculture

Broadcasting hours :	Mon	5:45 - 6:00 pm	Modern Farmer (Crops)
	Tue	3:15 - 3:30 pm	Modern Farmer (Livestock)
	Wed	6:15 - 6:30 pm	Food & Nutrition
	Thu	6:15 - 6:45 pm	Weekly Bulletin

Note: Reforming of the RTD education / enlightenment broadcasting is wanted so that providing of the information agreeing in each of the 6 agriculture districts in the

country will be possible.

Ministry of Welfare

Broadcasting hours :	Tue	6:00 - 6:15 pm	Most health problem & conditions
		9:45 - 10:00 pm	public
	Thu	6:30 - 7:00 pm	Safe motherhood
	Fri	8:15 - 8:45 pm	Malaria control
		9:30 - 10:00 pm	Malaria control
	Sat	9:30 - 10:00 pm	Discussion drama
	Sun	5:00 - 6:00 pm	Variety show

Note: “Indicator Monitoring Survey Vol-1 Preliminary Report Bureau of Statistics  
Distribution of best source of information about AIDS illness among members of  
10years old and over”

<u>Radio</u>	69.9%	←
Newspaper	5.9%	
Health facility	6.6%	
Church, Mosque	4.5%	
Neighbours/Friend	8.7%	
Public Meeting	1.8%	
Others	2.6%	

To clarify the relations between RTD and the ministry agencies / educational departments, letters of inquiry were sent and at the same time we had an interview with the officials in charge.

Followings are the responses to the two main questions, in which up-grading of RTD is very much wanted.

- |            |  |
|------------|--|
| Question-1 | What are the effects of the radio broadcasting ?             |
| Question-2 | What do you expect from the education broadcasting program ? |

Ministry of Education and Culture

Answer-1 To improve the quality of the classes from inefficiency due to lack of textbooks / teaching materials.

### Ministry of Science, Technology and Higher Education

- Answer-1            By listening, people can have knowledge which can be used in real life.  
New knowledge and skill can be learned.  
The program will be more understood by sending message in Swahili, and cooperation between the tribes will be promoted.  
It is very useful to promote the ability of reading and writing.
- Answer-2            More broadcasting hours which give people the opportunity of attaining fundamental skill in Swahili.

### Ministry of Agriculture and Co-operatives

- Answer-1            Agriculture is the backbone of the Tanzanian economy. Radio broadcasting is the key to spread the recognition of the importance of the agriculture technology.  
The union of the nation can be maintained if program broadcasting is done in one language in the whole country.  
If program broadcasting is done in one language and printed matters of its contents are distributed together, it will be very valuable in 2 aspects; a) in raising the ability of reading and writing and b) in diffusing the common language.
- Answer-2            Educational programs will promote the consciousness of the agriculture community, especially of young farmers.

### Ministry of Health

- Answer-1            Many listeners can attain radio programs in a short time. This characteristic is useful for the broadcasting education activities.  
By using our language (Swahili) in radio broadcasting, it is possible to appeal for the national consensus through Swahili program. This is easily accomplished by the radio with its advanced ability of approaching to the audience.  
Science educational programs that are planned carefully promotes the above various points.

Answer-2 Through programs in which the radio listener / program provider are taken in their center, broadcasting will be useful for the illiteracy eradication. Development of research and science progress should be reported.

#### Ministry of Labour and Youth Development

Answer-1 If Radio Tanzania can be received in the whole country, training programs can be distributed to the whole country easily and also simultaneously. In other words, all useful information can be delivered to the ears of the public.

People can know what is / where things are happening when all useful information are broadcasted through out the country.

Programs are preferable to be in Swahili as much as possible. With this, more people will learn and the ability of reading and writing will be improved. Broadcasting will be more utilised as a result.

Answer-2 Some of the young men we assisted have not even completed the Primary Education. Most of them must acquire the fundamental skills and some need more advanced skills to improve the working efficiency in their workplace. We are expecting for program organization, which can realize these requirements.

#### Ministry of Community Development, Women Affair and Children

Answer-1 Education to solve the social / economic problems will be possible in a national scale by using Swahili, which is used everywhere in the country.

Answer-2 We expect the educational broadcasting programs to explain the nation's duty in the development of the country, and to support the activities to solve their problem.

#### Institute of Adult Education

Answer-1 Broadcasting supports the promotion of the education. Programs should include, however, the specified courses offered by the Institute of Adult Education.

Answer-2      Radio Tanzania should discount the broadcasting fee for the programs of public society and the education purpose.

Note;    RTD broadcasting fee

7,500 Tsh / 15min

10,500 Tsh / 30min

### University of Dar es Salaam

We interviewed the Vice Chancellor Mr. Matthew L. Luhanga, University of Dar es Salaam about the values of school broadcast programs.

He mentioned that school broadcast programs would be useful for improving students' fundamental ability from its wide-area instantaneity. He also mentioned that the diffusion of the education, on the base of equal opportunities for education, would be indispensable to save Tanzania from its backwardness and its low productivity.

### UNICEF

We interviewed the Head of Education and Child Development Mr. Augustine Obeleagu Agu UNICEF about the values of the educational / enlightenment broadcast. The wide-area instantaneity of the broadcasting was mentioned here again, and the necessity of the textbooks was strongly emphasized for more effective school broadcasting. The "School Committee Member Training Manual" was presented as an example.

As shown from the above investigation, RTD is very much expected by the ministry agencies / educational departments with the aim to restart the school broadcasting again. Japan, supporting these activities, will absorb the attention of the world from now.

## (2) RTD and the School Broadcasting

The educational department in Tanzania is divided into the Ministry of Education and Culture (elementary and secondary education, teachers education, adult education) and the Ministry of Science, Technology and Higher Education (University, Professional education). In elementary education, there are grade 1 to 7 and in secondary education grade 1 to 6. The educational system is basically taken from the British system and there are 13 years of preparation education before entering a university. The number of school children / students are shown in the following (investigation of 1998).



	<b>Elementary education</b>		<b>Secondary education</b>		
	Male	Female	Male	Female	
1	351,829	340,086	1	19,051	1,225
2	344,599	336,092	2	16,078	1,019
3	326,368	319,057	3	13,172	545
4	329,972	324,710	4	11,321	482
5	235,781	238,760	5	3,298	25
6	246,238	252,318	6	3,100	25
7	194,652	194,757			

Though male ratio is much higher in above secondary education data, the sex ratio balance is improving through out each grade seeing from the statistics of '61, '71 and '98. Especially in grade 6, female ratio was recorded as '61 - 9%, '71 - 14%, and '98 - 35%, showing the improvement of the sex ratio balance.

In “The Rolling Plan and Forward Budget for Tanzania for the Period 1996/97 - 1998/99”, the educational guideline indicated that ‘the investment in human resources will provide general knowledge in daily life and at the same time accumulates the skill which is necessary for building a productive society’. This shows that actions for the diffusion of the education have been steadily progressed.

As for the diffusion rate of school broadcasting in secondary schools, 242 out of about 495 schools possessed a radio receiver, and RTD education program was chosen and used in lessons by hearing in classes.

The aims of the school broadcasting programs according to “The role of Radio Programmes to Secondary School and Teachers' Colleges, Ministry of Education and Culture” are as follows;

- 1) To reinforce fields that are short of teaching materials / textbooks.
- 2) To support private secondary school students to learn equally with public secondary school students.
- 3) To provide useful knowledge / information to the student who attends correspondence education.
- 4) To provide the latest knowledge / information to the teachers especially in science field.
- 5) To provide educational programs which will be useful for training the abilities of

students / children.

- 6) To transmit technical / vocational information which raises the teacher's degree of knowledge / skill.
- 7) To transmit the latest information of the education field to the teachers in remote places.
- 8) To provide complementary teaching materials to the students of Teachers' Colleges.

(3) RTD and Christian church / Islamic mosque

Both Christian church and Islamic mosque have their regular program on RTD. Lutherans church has their recording studio and time-to-time brings the recorded tape to use it as a part of the missionary program. But usually missionaries come to RTD and the missionary programs are being made. This is the same as for Islam.

For the Christmas mass, the Koran in the fasting month and etc, staffs and material are sent to the church or the mosque, and RTD carries out a live relay / recording.

We had an interview with Rev. John Kimweri, Christian Council of Tanzania and questioned on his opinions about the values of the RTD electric wave.

1) The meaning of utilizing the electric wave of RTD

To respect the only instructions given from God, to maintain peace and to support the economic reconstruction, propagations are made in each local city but from the deficiency of the human resources / traffic means it is not having satisfactory effects. To introduce God's instruction to more people in Tanzania, the countrywide broadcasting net of RTD is important.

2) What is Education ?

It is important to have the knowledge of science or the world situation, but before that a sound mind must reside in people's heart. As for the education, there must be mental upbringings on its basis.

3) Situation of propagation in local cities

As medium wave broadcasting does not reach the local side area fully, short wave broadcasting is being used. However, there are not many people in the local side farmers who can handle the short wave receiver and they hope that the middle wave broadcasting will be sufficient in the very near future. Though pastors sometimes

make trips to the local district for propagation, the traffic is inconvenient and it is not very successful. A sufficient broadcasting is expected also from this aspect.

4) What do you expect from RTD ?

We are using the telephone line on live telecasts. 320,000Tsh each is used on Christmas and Easter, and it's a burden for our association.

5) Is there a return from the believer by the missionary broadcasting ?

It is reported to the church through people of the grass roots movement twice a month. We do our very best in such cases to help people solve their problems.

### **1-3 Contents of the request**

The Tanzanian government requested the Japanese Government's Assistance to reconstruct a RTD Broadcasting Center and Kunduchi Transmitting Station in order to improve the quality of school education to promote social economy development.

Major item requested by Tanzanian Government is as follow :

#### Kunduchi Transmitting Station

- (1) Supply and Installation of MF Transmitter
- (2) Supply and Installation of Power Supply
- (3) Supply and Installation Base Insulator of Antenna
- (4) Construction of New Transmitting Station Building

#### RTD Broadcasting Center

- (1) Equipment for Production Studio (Studio-1 and Studio-3)
- (2) Equipment for Continuity Studio (Studio-4, -5, and Y)
- (3) Equipment for Master Control Room
- (4) Program Transmission Link

## **Chapter 2**

### **Contents of the Project**

## **Chapter 2 Contents of the Project**

### **2-1 Objectives of the Project**

This project is to reconstruct the Dar es Salaam Broadcasting Centre, the studio block and the Kunduchi Transmitting Station, the 100kW MF transmitting facilities to enable the RTD to produce and broadcast high quality educational program aiming for the improvement in the quality of education and enrichment broadcast.

## 2-2 Basic Concept of the Project

### 2-2-1 Study Result of the Project

#### (1) Alteration of request

The request contents of this plan were changed one after another as shown in the Table 2-2-1 from the original request contents based on the examination result of the first investigation and the second investigation.

Table 2-2-1 Alteration of Request

Project Site	Existing Equipment and Facilities	Original Request	First Investigation	Second investigation
Kunduchi Transmitting Station	Transmitter			
	Power Supply Equipment			
	Transmitting Antenna	Replacement of Base Insulator	Reconstruction of Directional Ant.	Reconstruction of Directional Ant.
	Building	( Prefabricated )		( Reinforced Concrete )
RTD Broadcasting Center	Master Control			
	Studio-1			
	Studio-2	-	-	-
	Studio-3			
	Studio-4		-	-
	Studio-5		-	-
	Studio-B	-		
	Studio-R	-		
	Studio-Y			
	Program Link	( FM Channel )		( UHF Band )
Building	-	-	New Construction	

(2) Confirmation of the Contents

The following is the final confirmation of the project contents. (Fig. 2-2-1 reference)

1) Kunduchi Transmitting Station

MF Transmitter	1set	Renew
Transmitting Antenna	1set	Renew
Station Building	1set	New construction

2) RTD Broadcasting Centre

Master Control	1set	Renew
Studio Equipment	5sets	Renew
Building	1set	New construction

3) Program Transmission Link

1set	Renew
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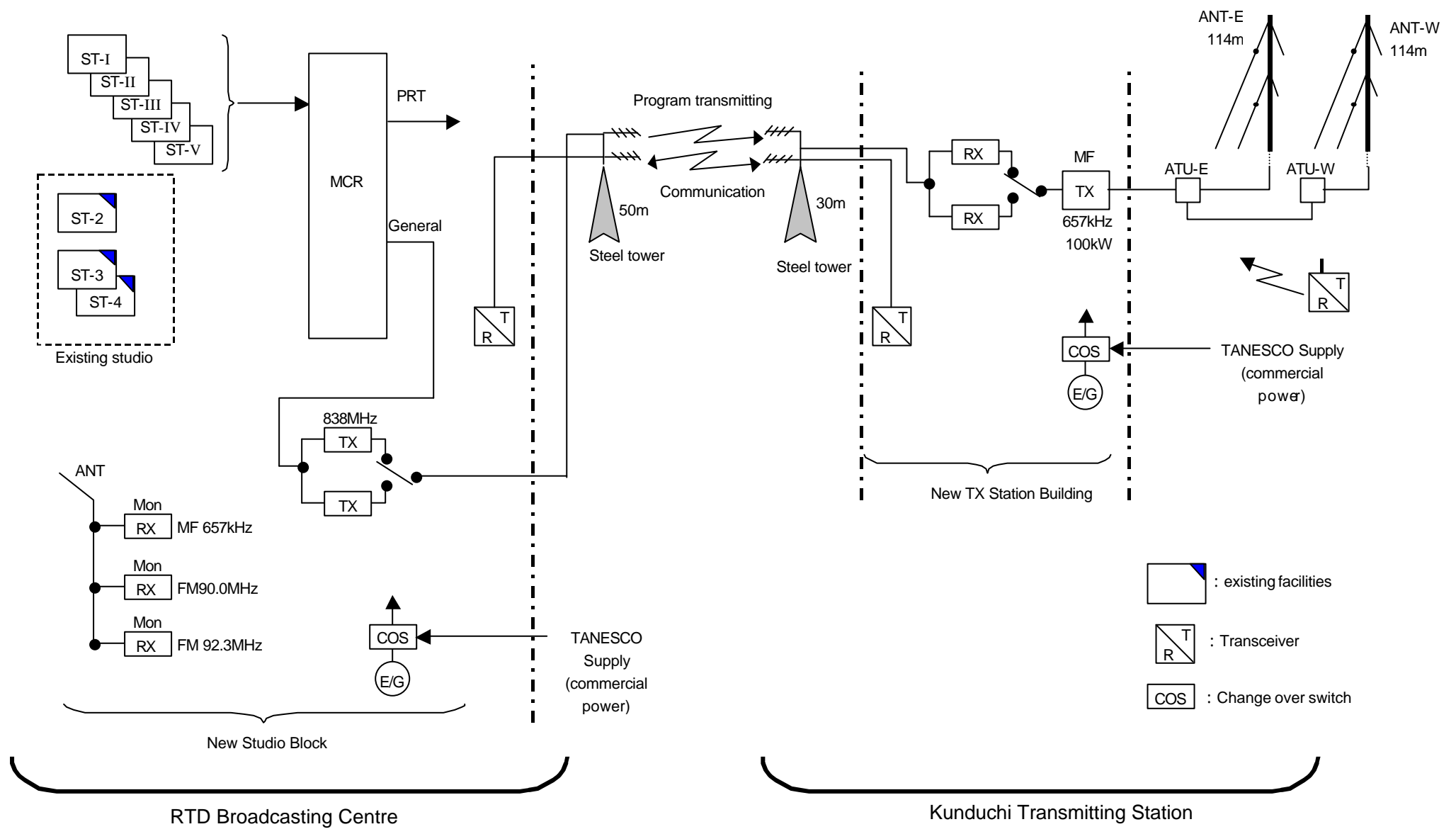


Fig. 2-2-1 Outline of Facilities & Equipment



## 2-2-2 Kunduchi Transmitting Station

### (1) Medium Wave Transmitter

The existing transmitter system in Kunduchi Transmitting Station consists 2sets of 50kW transmitter (Vacuum tube-type).

However, operation of the Transmitter was stopped in 1997 due to the ageing of the Transmitter and the unavailability of the vacuum tube and the other reserve stocks.

The answer to the request from Tanzanian Government is that the new transmitter is planned with output power 100kW and frequency 657kHz which was registered in Frequency Assignment Plan for LF/MF Broadcasting Station, Third Edition of Annex 1 to regional Agreement (Geneva, 1975), ITU for Dar es Salaam.

### (2) Directional antenna

Directional antenna in Kunduchi Transmitting Station is registered in the above Third Edition of Annex 1 to the Regional Agreement (Geneva, 1975), ITU and its directional characteristics are as follows.

Main Beam	270degree N
Frequency	657kHz
Rated Power	100kW
Construction	Radiator and Reflector

The existing directional antenna is having a risk of collapse with the joint of the tower and the insulator corroded. The requested replacement of the corroded base insulator part is not a realistic reconstruction method.

On modifying the current ITU Registry, RTD needs the recognition from the cabinet. If the change procedure of ITU Registry started at the time when the equipment aid is confirmed, the implementation plan of the project will not be appropriate to the actual condition of ODA project promotion.

If non-directional antenna is adopted, the broadcasting service area in the inland will reduce and this deviates from the reconstruction purpose.

After examining the above-mentioned contents of investigation, we made a postproduction of the design philosophy as to erect the antenna with 2 guywire masts,

which satisfy the directional characteristic of ITU Registry.

(3) Broadcasting service area

We presumed the field strength with 100kW output power transmitter and directional antenna (N270 degrees max.), referring to CCIR Rec368-5 and Soil Atlas of Tanzania.

(4) Transmitting Station Building

Structural deterioration of the existing transmitting station building is conspicuous. Our conclusion is that new construction of transmitting station building is necessary as some cracks in the wall were found due to the uneven sinking of the building foundation.

In accordance with the request from the Government of Tanzania, prefabricated building like those of Dodoma and Kigoma Transmitting Stations should be constructed.

However, we decided that the new Transmitting Building is constructed by the reinforced concrete building because water and other material for building construction can be obtained easily in Kunduchi area in comparison with the above two stations.

### **2-2-3 RTD Broadcasting Centre**

(1) Master Control Room Facilities

It is consisted of the following facilities which enable a) receiving the program from the studio inside / outside the broadcasting station or from other broadcasting stations, and b) broadcasting to the transmitting station or to other broadcasting stations according to schedule.

Program sending facilities

Program distribution equipment

Radio wave monitoring facilities

Program identification facilities

Clock system

Communication facilities

(2) Studio Facilities

Studios are divided in the following 3 types refer to the contents of the programs they produce and broadcast

Type L : Referred to Existing Studio 1

Type M : Referred to Existing Studio 2 and 5

Type S : Referred to Existing Studio 3, 4, B, R and Y

The facilities to be reconstructed are the 5 requested Studios in Type L and M, and 3 in Type S.

(3) The new studio block

After the examination about the reconstruction based on the request, the following demerits were confirmed in the case of utilizing the existing facilities.

- 1) The existing Studio was built by British Aid in 1954 and the aging is exceptional. The study of structural strength of the building will be difficult when renewing the studio roof.
- 2) It is necessary to build a temporary studio when reconstructing.
- 3) It is difficult to reserve the space of scaffoldings for the reconstruction.
- 4) There is a danger of building crash during the reconstruction.
- 5) Power supply and air-chilling system need to be reconstructed totally since the new construction standard is to be applied.
- 6) The building has grown extremely old that the use period after the reconstruction cannot be specified.
- 7) The installation fee of the reconstruction will be almost the same with that of the new construction.
- 8) It is impossible for RTD to find a source for installation fee if the reconstruction is ranged in the construction without aid.

As a conclusion, the reusing proposal including the reconstruction of the existing studio was judged as inappropriate and the construction of the new studio block was included in this equipment renewal plan (proposal) for renewal of existing Master Control Room, renewal of the existing 5 Studio and its ancillary facility.

#### **2-2-4 Programme Link Equipment**

In accordance with the request from the Government of Tanzania, FM Broadcasting Relay System should be used to link the RTD Broadcasting Centre and Transmitting Station.

However, we judged that the FM Broadcasting Relay System is not realistic due to the interference problem caused by the inexperienced maintenance staff of the over-crowded FM Radio Station.

In conclusion, it is imperative that RTD adopts its exclusive circuit as a program transmission link from RTD Broadcasting Centre to Kundouchi Transmitting Station by UHF.

Therefore, the UHF propagation circuit shall be planned so as not to be obstructed by the high-rise building or hill between the link transmitter and receiver site.

For the countermeasure of the above, a steel tower(52m) to mount a transmitting antenna at the RTD broadcasting Centre and another one(32m) to mount a receiving antenna at Kunduchi Transmitting Station are planned respectively.

Steel towers are necessary to be constructed to adjoin both the Station Buildings to reduce the feeder losses caused by the distance between the antenna and the transmitter or the receiver.

### **2-3 Basic Design**

#### **2-3-1 Design Concept**

Playing an essential role in the advanced information society, it is no exaggeration to say that broadcasting, along with telecommunications, is one of the most important infrastructures, an indispensable element of human life like water and air. For this reason, broadcasting is expected to be sound and reliable, and function permanently, and the hardware and the building in which it is stored and operated must not only be durable and safe but be adaptable to future changes and development. The basic design for the buildings and the equipment for the Project shall be implemented under these basic principles with consideration for matters described below.

(1) Policy for natural conditions

RTD Broadcasting Centre in the city of Dar es Salaam and Kunduchi transmitting station where the Project is planned are both located near the coast and are susceptible to damage due to saline winds. In fact, the deterioration of steel observed in steel materials used in various facilities inside RTD Studio Centre as well as transmission antennas and buildings inside Kunduchi Transmitting Station clearly indicates the existence of saline problem.

The matter that should be given utmost importance in terms of consideration for the natural conditions in the building planning is to minimize the damage caused by saline winds. Use of steel materials shall be refrained as much as possible for the exterior and materials having high weather resistance to salt shall be used for exterior painting. In addition, when designing of wall openings of the buildings, selection of materials and set-up specifications shall be made with full consideration for saline problem.

The existing Kunduchi transmitting station building is equipped with vacuum tube type transmitters and mechanical ventilation system by which large volume of air is introduced and exhausted in and from the building, are adopted for cooling system of the transmitters. However, this system will not be a proper option for the new building since saline problem is expected in the areas.

The transmitters supplied for the Project are all state-of-the-art transistor type that have the merit of generating approximate 40 to 50% less heat compared to that of old vacuum tube type. Closed cooling system shall be adopted by taking advantage of this merit, introduction of air- conditioner as the cooling system for the transmitters in the new station building.

(2) Policy for social conditions

Respective ministries of the Tanzanian government are harboring very high hopes for RTD as an important means of transmitting enlightenment activities related to education and culture. The work to be performed by the Japanese side for the Project is in extremely technical hardware domain, comprising construction of broadcasting studio building and supply and installation of the broadcasting equipment. Therefore, it is not possible to directly express the considerations for a variety of social conditions in their design. However, as were the development of broadcasting projects in many countries in the past, it is an obvious fact that improvements in hardware domain has triggered remarkable improvements in the software domain, i.e. in programming compositions and their contents. When the Project is carried through, it shall further raise the expectations

of respective ministries and agencies towards RTD and their enthusiasm towards programming, and the technical quality of programme production and its transmission shall certainly improve upon completion of the Project. It is not difficult to imagine that the respective persons involved in program production will have renewed recognition about the need for improvement and progress amidst the environment surrounded by comfortable working space and reliable equipment.

Thus, it is necessary when moving the Project forward to have awareness and purpose of indirectly contributing to the development of RTD broadcasting project, i.e. to the development of education and culture in Tanzania. Based on this basic policy, it is very important to workout a program that would offer effective and adequate building and equipment suitable for the country's situation, within the framework of Japanese grant aid. This is one of the major guidelines in the design work and shall be positioned as the basic policy for social conditions.

(3) Policy for construction situation and grades of building and equipment

Situation of building construction in Tanzania is not very active. In addition, construction materials produced within the country are extremely few and the country is dependent on import for the majority of materials. Therefore, it can hardly be said that domestic contractors with advanced skills and excellent architectural engineers engaged in construction have emerged in large numbers. However, a situation in which architects and civil engineers that were hired locally in construction and civil engineering projects realized through the grant aid programmes implemented continuously by the Government of Japan are gradually mastering technical skills and are growing slowly but surely can be observed.

The studio building constructed for the Project will be the first full-scale broadcasting facility to be built through a grant aid programme in Tanzania and will require high sound insulation performance and air tightness. Dispatch of expert engineers that will take part in studio interior work from Japan is indispensable because construction inside the studio particularly requires fine skills. However, it shall be seen as an important training opportunity for construction workers that will be hired locally. It goes without saying that adopting conventional construction method and using large amount of locally procured materials is one of the major policies of building design. However, emphasis shall be placed on maintaining performance when securing soundproof performance as it is the lifeline of the studio. Compromise with local specifications and lower work level shall not be made easily with regard to design inside

the studio, and it would be important to design the studio by taking technology transfer into consideration and present an example of standard studio specifications. The same rule shall also be applied to design of the broadcasting equipment.

## **2-3-2 Basic Design**

### **(1) Equipment plan**

#### **1) Basic issue**

The facilities in this plan will be adopted basically according to the following, and the details will be specified in each product.

#### **(a) The standard and regulation of equipments**

The components in this project must follow the recommendation / standard shown below, and what is contrary should be excluded.

- a. Recommendation of International Telecommunication Union-R
- b. Recommendation of International Electromechanical Committee
- c. Japanese Industrial Standard
- d. Standard of Electronic Industries Association of Japan

#### **(b) Power supply system**

For power supply, 400V/230V 3 phase - 4 wire supply (commercial / automatic changeover function of engine generator / automatic start function of engine generator) is adopted. As a countermeasure for a Mains Failure, uninterrupted power supply facilities are installed in the studio block. This aims to avoid the interruption of broadcast from fluctuation of power supply, open phase and supply failures occurring frequently in the power supply condition of Tanzania (due to capacity shortage of the substations).

#### **(c) General plan for natural conditions**

The planned equipment and its installation in this project will be designed and constructed conforming to the international and domestic standards. The term of operation of the system should be temperature between 0 - 45 and relative humidity less than 95%.

Since the project site is situated in a coast district, the counter-major of saline

winds will be one of the major problems in the system design.

(d) Setting up of the facility grades

a) Reliability

One of the essential elements to improve the reliability is the simplicity of control and maintenance, and the other is the mitigation of the fault location.

Equipment should be selected from what was made by parts of the same kind and finished in a similar way as possible. It is necessary to have the system correspond to the use purpose.

- The commonness and interchangeability of the spare unit and replacement parts are important.
- As system component facilities, module assembly and solid-state device are adopted.
- The supply guarantee of the replacement parts should be more than 10 years.
- All parts in the facilities need to indicate a unique part number and it must have consistency with the record on the circuit diagram.
- All terminals and tag blocks need a display applicable to the wiring and the circuit.
- Each unit of large-sized equipments such as transmitter need fault indicating function and it should be easily inspected.

b) Safety

From both electric and mechanical viewpoint, the safety of maintenance staff and outsiders should be taken into maximum consideration.

- Maintenance staff and outsiders must be prevented from contacting directly the high voltage and high power area during system operation.
- Warning is given when the passage to the transmitter room is open.
- Protection net is set up to prevent maintenance staff and outsiders from approaching to high voltage and high power area directly.
- Radiator is installed to protect maintenance staff and outsiders from



the danger of high voltage electrification.

- Automatic indication to show broadcasting is on should be placed in the required parts so that broadcast will not be interrupted from incorrect control.

c) Equipments for professional use

Equipments for professional use are judged by the following viewpoints.

Broadcast equipments for professional use are expected to perform steady and exact operation at every moment, and are expected to record / broadcast the information correctly to the listeners. Even if it has a high performance, it will be inappropriate for professional use when it needs time and particular technique for that. Manuals for controlling and operating are necessary to be clarified.

In a broadcasting station, cases of using consumable facilities for audio equipments such as Microphone, Recorder/Re-producer, Compact Disk Player, Amplifier and Sound Effect Equipment premised on using as a throwaway has increased but we consider this is not appropriate as for the planned equipments.

Consequently, it needs to satisfy the following conditions to adopt the facilities.

- It should be repairable fundamentally in the recipient country (exchanging of the equipments such as print boards has to be easily done).
- Permanency (domestic / overseas operating experience).
- Easiness in using (domestic / overseas operating experience as a broadcasting facility).
- High efficiency (stated in the specification)
- The impedance of sound input and output should be the balance type of 600 basically.

d) Mechanical necessary condition

Except the special cases, the facilities in this project should satisfy the following conditions.

- A suitable anticorrosion treatment is needed on all metal surfaces.
- The paint for parts such as the top plate of control console, panel surface and portions similar to it must be strong and firm over a long period.
- The combination of color should be reproducible and the finish colors of equipments must be harmonic as a whole.
- Except for the special cases, opening parts of every equipment and control panels must be easily controlled and smoothly operated. As for setting / dismantling of each unit, it has to be firmly fixed using the guide rail etc. or be easily dismantled without damaging the connector etc.
- In the case of using the forced air-cooling, filters may be used if necessary to hold the inflow of the particle of dust from the exterior to minimum. Parts that would grow adhesive with aging will not be used.

(e) Tape recording system

Open Real Tape Recorder/Re-producer had come to be recognized as practical equipment since plastic tape of 6mm width was devised in the end of 1940s. It was widely adopted in broadcasting stations and was the mainstream of Recorder/Re-producer for a long period.

The compact cassette type Recorder/Re-producer came out in 1963. Loading of the tape became easier compared with the former open real type and this made recording and replaying simpler. It has spread to all over the world in a short time and the software of recording tape also was marketed in large quantities.

Around 1988, Cassette Type of DAT (Digital Audio Tape) Recorder/Re-producer appeared on the market with improvement in the quality of recording. And in 1990s, equipments, which could also be used for on air or production, were produced.

Thus, different types of Recorder/Re-producer have come to be in use. The rate of 6 mm tape recorder has gone down and with its number decreasing, it has come to be categorized in special equipments.

In this situation, it is likely to become harder and harder to get 6mm tapes.

From this reason, we decided to introduce Digital Audio Tape, the mainstream

Recorder/Re-producer, in this project. This was also requested by the local side.

However, in the history of half a century, RTD had recorded programs they had produced including the School-broadcast on 6 mm tapes and they are preserved abundantly in the tape library.

6mm open real tape Recorder / Re-producer is also in the existing facilities, which will be reused in this project, and this will be used continuously in the future.

From above situation, new 6mm open reel tape Recorder/Re-producer will be partly introduced so as these 6mm tapes could be used for broadcasting without problem.

The following is the advantages expected by using Digital Audio Tape.

- Excellent sound quality.
- Long time recording is enabled. (120 minutes)  
With Type 10 / 6mm open real tape, 6mm open real tape Recorder/Re-producer, only 60 minutes recording is possible. (Tape speed 19cm/sec)
- The tape loading and controlling is easily done.
- Sound quality will not be degraded even when duplication is made.
- Cassette tapes are small in size and can be carried easily. The space for storage can be reduced. (DAT: 73 × 54 × 10.5mm)  
Size of Type 10 / 6mm open real tape; outer diameter 267mm, 12mm thick

As shown in Fig. 2-3-1, the Operation Procedure of the existing 6mm open real tape Recorder / Re-producer and the new DAT Recorder / Re-producer will not have trouble.

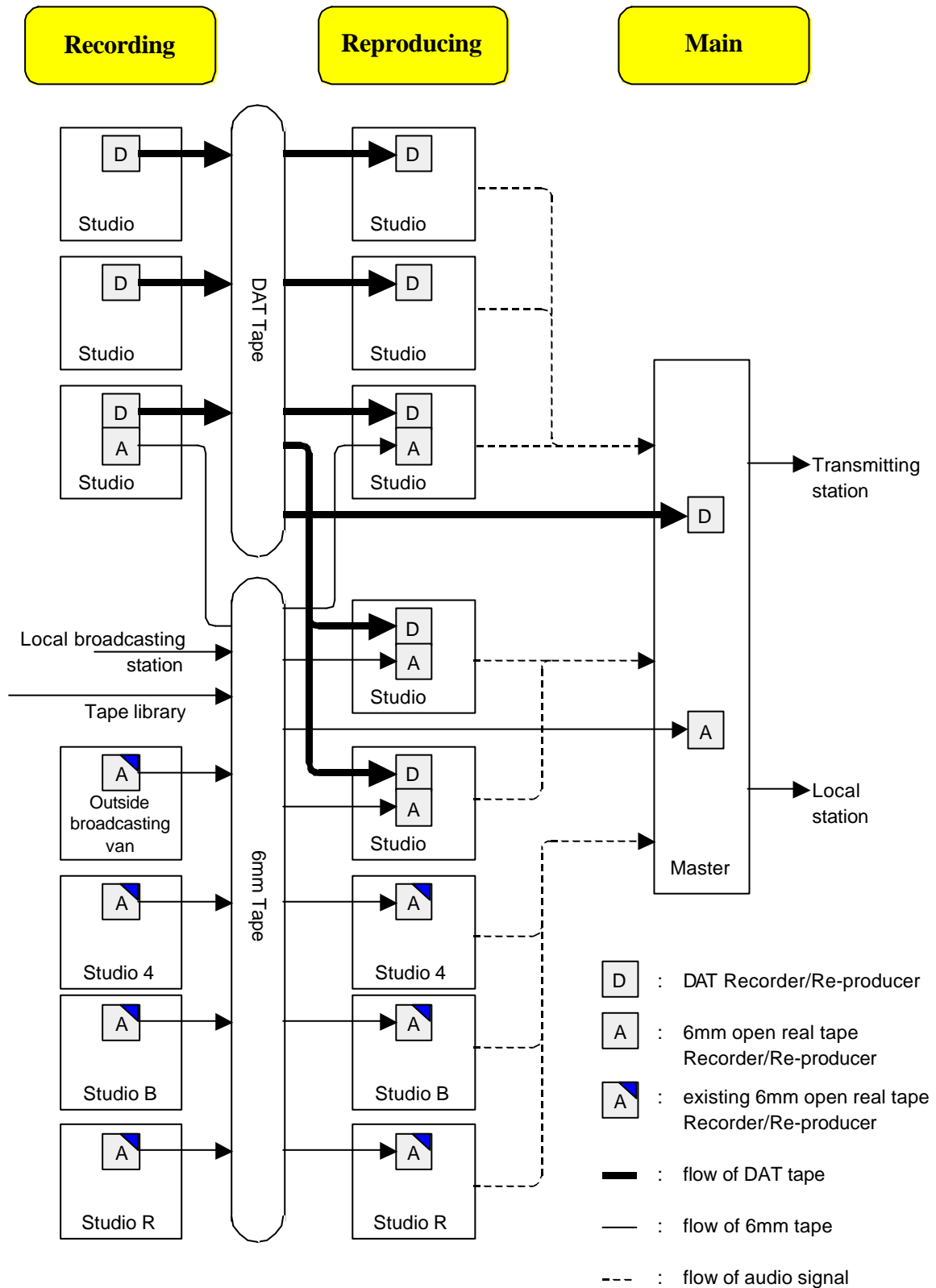


Fig. 2-3-1 Flow of Recording Tape (DAT / 6mm)

(f) Spare Parts

a) Fundamental view

Generally, in order to operate broadcasting equipment within a specified tolerance set by the organization, the engineer in-charge of the section shall carried out the preventive maintenance, controlled maintenance and corrective maintenance in accordance with the pre-planned maintenance schedule.

Therefore, the engineer must be informed himself for the number of the parts used of each equipment and the real number of the stocked spare parts to carry out various maintenance work smoothly.

The number of the spare parts to be stored is calculated from ATTR (Average Total Time for Repairs) of every equipment and ATBB (Average Time Between Break-downs) and the engineer in charge must always maintain the storage quantity so that it is sufficient to last for the year.

To target the successful operation of the broadcasting service, the management of broadcasting shall have to taking care of the report of the operation and maintenance from the engineer in charge sincerely.

The decision maker should not, even unconsciously, give second place to the maintenance against the new development project in the budget distribution in the year.

Both of the ATTR and the ATBB of the equipment vary these characteristics in environment (the power supply stability, weather condition, and a technology level of the maintenance crews ) of the operating site.

Thus, the engineer in charge of the equipment shall grasp the characteristics of a maintenance site and a maintenance shift team and he has to instruct suitable countermeasures for the report which is received from every job site.

The supply guarantee period of the spare parts of the equipment makes it more than 10 years so as to carry out various maintenance work smoothly.

The price of the spare parts must be calculated again during spares supply guarantee period based on the fixed calculation formula for the successive order due to the rapid price change that is not acceptable.

But, the substitute parts which is equivalent to the appropriate parts can be supplied when the change of the manufacturing process due to the natural disaster or economical crisis that occurred in the supply guarantee period.

b) The range of spare parts

General view

- Rotating and abrasion parts  
Preference will be given to the rotating and abrasion parts such as a cooling fan, exhaust fan and the recording/re-producing head which are necessary to be changed within 2 years.
- Spare unit  
It is decided that a print circuit board be arranged as a spare unit as far as possible.  
However, a module (for example, transmitter PA module, audio line amp, limiting amp and so on ) can be arranged if necessary.
- Lamp and fuse  
Reserve stocks for two years are arranged for the part such as the lamp and the fuse which have to be changed within one year.

Studio Equipment

- Line amplifier  
To construct the substitutive function of Line Amplifier such as Dividing Amplifier • Limiting Amplifier • Line Amplifier • Line Equalizer • Limiter/Compressor by the system composition, Spare Rout • Spare Shelf • Spare Switching Function • Spare Jack Field and others are necessary and it is not advisable to construct an active Studio System.  
Therefore, one set of Spare Parts and one set of Spare Unit is arranged for each type of the Line Amplifier respectively.

- Recorder/Reproducer  
The spare unit of each model is arranged for the Recorder/Reproducer (Compact Disk Player 5sets · digital Audio Tape 11sets · Mini Desk 5sets · Compact Cassette Tape 9sets) maintenance.  
The spare parts of the drive units are arranged for open reel Tape Recorder/Re-producer and Disk Player.
- Audio mixer  
The common module is arranged as a spare unit for 24 channel and 16 channel Audio Mixer.  
And, channel-fader, variable resister, switch, and so on are arranged as for the spare parts.
- Others  
One set of each type is arranged as for the reserve stocks for the following.

Speaker, wall mounting type	14 sets
Sub Cbck	23 sets
Communication Facility, room to room type	9 sets

#### Transmitting Facilities

- STL and PIE  
Because Main/Standby System is adopted for STL and PIE, the arrangement of the reserve stocks is not done.
- Transmitter  
A planned transmitter is designed with a high redundancy. However, when only one transmitter form is adopted in the transmitting system, then the spare stocks are arranged by the following.

PA module : The lower limit of the transmitter output power that can be permitted is made 90kW, and a difference from the number of the PA module operation in the 100kW is arranged as the reserve stocks depending on the construction of PA Module of the transmitter.

Lower stage module : Because single operation is adopted in a

basic plan, the Spare Print Board is arranged as the spare stocks for the following module.

A/D CONVERTER	1 set
MODULATION ENCODER	1 set
RF DRIVER	1 set
TX CONTROL	1 set

Others : The following is arranged as an initial supplementary part.

Fuses	200%
Fan	1set
Air Filter	1set
Transistor	100% of the transistors being used for the spare unit

- Directional Antenna  
Lumps and Fuses for Obstruction Light are arranged as a spare part for Transmitting Antenna.
- Emergency Generator  
The maintenance contract between RTD and the supplier is that the maintenance for the Engine Generator be bone by the self fund of RTD.
- Distribution Board  
Fuses, Lumps, Print Board for control system are arranged as a spare parts for the Power Distribution Board.

## 2) Transmitting equipment

### (a) Transmitter

Transmitter recommended in this equipment renewal plan adopts the Solid-state Digital Modulation, and it shall obtain 100kW Output Power from one transmitter.

The transmitter recommended in this equipment enhancement plan is that a solid-state digital modulation is adopted, and it's output power is 100kW by one transmitter.

The Power Amplification Unit of the 100kW solid-state digital modulation



transmitter consist of 100s(depending on the manufacturer) of solid-state power amplifier which controlled by the digitalized voice signal.

The advantage by the digital modulation accepted in this plan is as follow.

- a) Better maintenance support which lasts for a longer period can be expected because the world wide technical trends has moved to the digital modulation system in the high power medium wave transmitter.
- b) The uniformity of the monthly operation and maintenance expenditure of the radio station can be realized using solid-state transmitter because large electric power tube, a high voltage transformer, and so on have become unnecessary.
- c) The decrease of the operation expenses of the radio station can be realised due to the synthetic efficiency of the transmitter which has improved to about 80% by not using the large audio power amplifier.
- d) A operational hindrance doesn't arise even if about 10% of the total number of the power amplifier breaks down in the Power Amplification Unit because it is compensated by other power amplifiers.
- e) Durability against lightening surge is improved because the Power Amplification Unit is combined by many solid-state power amplifiers in series and obtained it's output power. Hence the surge is divided into each solid-state power amplifier evenly.
- f) A protection circuit of the solid-state power amplifier is set up against any unusual impedance change in the transmitting antenna.
- g) Provision of the standby equipment becomes unnecessary by above d), e), f).
- h) The part using the high voltage is limited, and safe maintenance work can be done.

For cooling system of transmitter, there are handy cooling system, Cooling Duct System and Air-chillier System. However, in this renewal plan, we adopt the closed circuit air-cooling system, which is often used in dusty area or in costal area where humidity and salinity is high. This will improve the reliability of the transmitter.

- (b) Dummy Load

For transmitter maintenance, 50kW dummy load with forced air-cooling system will be installed.

Dummy Load Chamber shall be isolated from the transmitter room and hot air will be sent out using the exhaust fan.

(c) Power Change-over Switch, feeder impedance matching unit

Power Change-over Switch will be installed for transmitter output. This will enable switching of the antenna and the Dummy Load. For impedance matching of the transmitter and the feeder, feeder impedance matching unit will be installed.

(d) Program Input Equipment / Monitoring Equipment

Program Input Equipment will have 2 systems to gain consistency with the program link equipment. Monitor of the signal system will monitor the operational condition of the TX station selecting

- a) input and output of the limiter or
- b) output of the Program Input Equipment or
- c) Output of the transmitter, by the changeover switch.

(e) Transmitting antenna

Both ground wave propagation and ionosphere propagation are important in propagation of the high power medium wave.

In long distance ionosphere propagation, absorption of ionosphere is tremendously great in the daytime and the influence can be ignored. However, in the night time density of electrons will decrease in ionosphere D and the grade-A zone will reduce due to fading caused by the reflection on ionosphere E and F. To set the fading area as far as possible, the radiate power of N270° direction is made the maximum and the N90° direction the minimum. This directional characteristic is determined taking the consistency with ITU Registry into consideration. (Cf. Frequency Assignment Plan Appendix 2, International Telecommunication Union)

For self-supporting tower, there are problems shown below. Also taking the saline problem due the sea breath into consideration, we will adopt the guywire

mast in this equipment renewal plan, which could be expected to have sine wave current equivalent to down lead antenna.

- a) Since Self-supporting tower's antenna cross-section is wide and wave impedance low, attenuation factor will increase and unit-fading effect will be ruined. Thus, it is preferable to have the cross section of tower as narrow as possible within the acceptable limit of mechanical strength.
- b) If a comparison is made in 100m-iron tower, about 70 tons can be expected on self-supporting tower and 50 tons on guywire mast. This difference in the weight will be the difference in the number of base insulator. On self-supporting tower, stray capacitance between the grounds increases and it is hard to get the radio frequency insulation.
- c) From the aspect of price, self-supporting tower has disadvantage against guywire mast in both material cost and installation fee. Increase in the maintenance cost is also expected.

(f) Feeder

Coaxial feeder is required in the application of Japanese aid from Tanzania but we will adopt Open Wire Feeder, taking the simplicity of maintenance and the price in to consideration.

(g) Setting up of the broadcasting service area

The most important point in setting up the broadcasting service area is the field strength distribution. The best way to produce field strength charts formally was to set up the broadcasting service area by surveying the field strength of the major points and adding in the calculation number. However, in the case of Kunduchi Transmitting Station, we were not able to measure the field intensity since the spare parts supply for the existing facilities had stopped and the transmitter could not be operated. Therefore the field strength charts is post produced citing the CCIR, Rec.368-5.

Ground constants (conductance and dielectric constant) that intricately influence each other will be presumed referring to Soil Atlas of Tanzania.

The following data were referred to presume ground constants.

a) Soil Water Retention

- b) Soil Stoniness
- c) Physical Features
- d) Vegetation

Other constants

- a) Transmitting output power of 100kW
- b) maximum antenna gain of 3dB (Frequency Assignment Plan for LF/MF Broadcasting Station, Third Edition of Annex 1 to the Regional Agreement (Geneva, 1975). International Telecommunication Union.
- c) Broadcasting service area of Kunduchi Transmitting Station shown in the basic design survey report by Japanese International Cooperation Agency (May, 1988).

(h) Power supply facilities

According to the Master Plan of TANESCO, substation in Kunduchi district will be renewed to 15MVA and it is to be completed in the end of 2000. The unsteady power situation now is expected to improve and so we will not adopt uninterrupted power supply in the transmitting station.

Emergency generator will detect the information of supply failure / open phase / fluctuation, and will have automatic start function.

Power via automatic voltage regulator will only be supplied to the broadcasting facilities basically. However, Air-chillier System included in the building facilities will not be in this context.

3) Studio Equipment

(a) Master Control Room Facilities

Other than the facilities which enable receiving programs from the studio inside / outside the broadcasting station, or from other broadcasting stations and broadcasting to the transmitting station or to other broadcasting stations according to schedule, facilities such as to monitor the radio broadcast wave and to confirm the broadcasting programs will be installed.

a) Program sending facilities

On air switcher will be installed to send the particular program to the transmitting station and other broadcasting stations, on the particular date

and time according to the broadcasting table.

In the existing Master Control Room facilities, these switching are done by the Patching Cord. This is done by hand and it could cause broadcasting interruptions due to control failure when several connection changes are needed at the same time.

In this project, we will install facilities, which will ensure the program switching by push button control, so that it could be operated by few staff.

b) Program distribution equipment

Programs produced in broadcasting station studio, and programs sent through program link from outside or other broadcasting stations will be received. Facilities will be installed to compensate the character of received audio signal and to adjust the signal to a proper size. We will also install facilities for distributing these signals to the studios.

Existing materials will be reused partially.

c) Radio wave monitoring equipment

Receivers will be installed for operation monitoring of the radio broadcast wave from the transmitting stations such as Kunduchi, Mabibo and Pugu Road.

Existing receivers will be shifted and be reused.

d) Program monitoring facilities

We will install speakers in each room of related sections to confirm the contents of the program being broadcasted, so that program broadcasting can be operated from the master control room.

To cope with the questions or grievance given from the listeners and sponsors, log recording facility will be installed to record all the programs broadcasted.

e) Clock system

A master clock is set in the master control room. It generates and distributes the standard signal of the correct time indispensable for program production, to the sub clocks installed in the blocks concerning the broadcasting service and energize them.

Time signals for broadcasting will also be taken from the master clock.

f) Communication facilities

Communication facilities such as interphones and transceivers will be installed mainly in the master control room. This will make the series of work go smoothly, from producing a broadcasting program to emitting it as a radio broadcast wave.

Existing facilities will be reused partially for outside broadcasting vans and facilities for communication between the transmitter stations.

(b) Studio Facilities

Japan in response to the Tanzanian Government's request has planned to renew the decaying studio facilities including 5 studio equipment and a master control room equipment in accordance to the basic understanding of Japan's Grant Aid in it's maximum effort.

A change in the Broadcasting Centre plan of RTD is as follows.

Table 2-3-1 Change in Broadcasting Centre Plan

Item	Existing Studio								New Studio				
	1	2	3	4	5	B	R	Y	I	II	III	IV	V
Name of studio	L	M	S	S	S	S	S	S	L	M	S	S	S
Type of studio													
Original request													
1st Survey alteration													
Basic Design													

Note:

L means large size studio

M means medium size studio

S means small size studio

means as planned for the rehabilitation

means as requested for the rehabilitation

means as to be remained for the recording studio

As shown in the Table 2-3-3, there is hardly free time for the operation of the RTD studio hence none of the remaining three studios can be put aside.

A studio function was given priority as for the re-allocation of the studio, thus one studio for the L type, one studio for the M type and three studios for the S type (continuity studio 2 rooms, production studio 1 room) is moved to new studio block.

As for the outline of the studio equipment, it is classified in 3 kinds as shown in the Table 2-3-2. The equipment of each studio is planned according to the program contents that are produced and being broadcast with the L type as for the existing studio 1, the M type as for the existing studio 2 and 5, the S type as for the existing studio 3,4, B, R, Y.

Judging from the investment efficiency point of view, those 3 remaining studios in the existing studio building are not suitable for repairs either for the production studio or the continuity studio.

Thus, in this plan, those remaining studios are used as a recording studio where time is adjustable so as to relieve the tight schedule of the 5 new studios.

Studio 4, Studio B and Studio R are selected to be used again in the existing building in consideration of the rain leakage and the studio size.

Usable equipment from the existing five studios are taken to be used in the three other studios as follows

For example,

Studio 4 : Audio Mixer replenish from Studio Y

6mm Tape Recorder Reproducer replenish from Studio 5

Studio B : Equipment replenish from Studio 2

Studio R : Equipment renewal is completed in 1998

So as to the above, the volume of the present program production and the broadcasting hours can be secured and new invention of sound effector and CD, MD, DAT, and others are introduced in the new studio so as to carry out the programme production effectively.

We aim at the high program production of the quality by RTD using this

enhancement plan.

Table 2-3-2 Outline of the Studio Facilities

Studio Type	Type L (Former Studio 1)	Type M (Former Studio 2 & 5)	Type S (Former Studio 3, 4, B, R & Y)
Studio for facility renewal	1	1	3
Main use purpose	Production Studio	Production Studio	Continuity Studio Production Studio
Programs	Music, drama	Small music band, symposium, lectures, post production	Operation Control, Talk, News, Interview, lectures
The features of renewal facilities	<ul style="list-style-type: none"> <li>· Audio mixer will be an analog type and Stereo correspondence, with 24 inputs</li> <li>· Sound effect machine with functions such as echoing, compression, Limiter and pitch modification will be disposed.</li> <li>· The main equipment for recording will be DAT.</li> <li>· CCT, CD, MD will be disposed for playing the software on market but disks will not be disposed.</li> <li>· Fold back function necessary for music recording is given to the studio floor.</li> </ul>	<ul style="list-style-type: none"> <li>· Audio mixer will be an analog type and Stereo correspondence, with 16 inputs</li> <li>· Sound effect machine with functions such as echoing, compression, Limiter and pitch modification will be disposed.</li> <li>· The main equipment for recording will be DAT.</li> <li>· CCT, CD, MD will be disposed for playing the software on market but disks will not be disposed.</li> <li>· Studio functions, which could be used extensively.</li> </ul>	<ul style="list-style-type: none"> <li>· Audio mixer will be an analog type and Stereo correspondence, with 16 inputs</li> <li>· As Operation Control Live broadcasting Studio, DAT, CD, MD, CCT, DISK and ORT will be disposed so that all sound materials could be played.</li> <li>· Telephone is disposed so that it is possible to broadcast the direct voice of the listener.</li> <li>· Communication line is reserved for the program relay input from outside of the station.</li> <li>· Introduce the cough box for announcer microphone.</li> </ul>
Studio floor area	80 square meters	36 square meters	18 square meters
Sub control room area	40 square meters	24 square meters	24 square meters
Notes			<ul style="list-style-type: none"> <li>· Uninterrupted power supply will be installed only in the General Service Continuity Studio.</li> </ul>

Notes:

Continuity Studio : Live broadcast studio that sends the entire program.

Production Studio : Studio mainly for producing and recording the programs.

Post Production : Edit the recorded materials into one completed program.

Fold back : Accompaniment given for the singer or player to hear the sound from a sub-control room without influencing the on going performance.



Table 2-3-3 Time-table, RTD Existing Studio Occupation

Sunday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											Music Recording
2																											PRT Program, General Music Rec.
3																											News Program
4																											General Continuity
5																											Studio Maintenance
B																											Studio Maintenance
R																											PRT Continuity
Y																											
Monday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											Radio Drama Recording
2																											PRT Program, General
3																											Poem, Language, Interview Recording
4																											General Concinnity
5																											Education Enlightenment Program Recordings
B																											General · Talk Program Recording
R																											PRT Continuity
Y																											General · Talk Program Recording
Tuesday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											UNDP · UNFA Program Recording
2																											PRT Program, General Music Rec.
3																											Religions Education Enlightenment Program
4																											General Continuity
5																											General · Talk Program Recording
B																											General · Talk Program Recording
R																											PRT Continuity
Y																											General · Talk Program Recording
Wednesday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											Local Music · Drama · Chorus · Program Rec.
2																											PRT Program, General Music Rec.
3																											Music · Interview
4																											General Continuity
5																											General · Talk Program Recording
B																											Education Enlightenment Program Recordings
R																											PRT Continuity
Y																											General · Talk Program Recording
Thursday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											Mother and Child (Drama) Recording
2																											PRT Program, General Music Rec.
3																											Interview
4																											General Continuity
5																											Education Enlightenment Program Recording
B																											General · Talk Program Recording
R																											PRT Continuity
Y																											General · Talk Program Recording
Friday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											Music and Dance Entertainment Program Rec.
2																											PRT Program, General Music Rec.
3																											Religion Music TopicsPleated Pro.
4																											General Continuity
5																											General · Talk Program Recording
B																											General · Talk Program Recording
R																											PRT Continuity
Y																											General · Talk Program Recording
Saturday	Time																								Note		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
Studio-1																											Drama Program Recordings
2																											PRT Program, General Music Rec.
3																											Drama Package Recording
4																											General Continuity
5																											
B																											General · Talk Program Recording
R																											PRT Continuity
Y																											Studio Maintenance

(c) Power supply facilities

RTD Broadcasting Centre will receive power from the substation in Kipawa. An industrial zone is included in the power distribution zone of this Kipawa substation, and great fluctuation is expected by the incoming voltage of the Broadcasting Centre. For this reason, an automatic voltage regulator is inserted and used in TANESCO Supply (commercial power).

Engine generators will be installed providing against the supply failure of TANESCO Supply.

Uninterrupted power supply will be set in the Continuity Studio (General Service), Master Control Room Facilities and program link equipment (Sender to Kunduchi Transmitting Station / Kisarawe). This will avoid the interruption of the nationwide general service program broadcast, during the time it is switched over to output power of generator on the occasion of power failure (about 60 seconds).

(d) Test equipment

It is important to have a suitable daily maintenance service for keeping the broadcasting facilities and equipments in good condition. For this, test equipments to correctly check the conditions of the facilities are necessary.

We decided to install mainly the equipments, which are easily used and are indispensable for daily maintenance, such as Audio Test Equipment, Oscilloscope, and AVO Meter.

(e) Program link equipment

From the following reasons, UHF Private Link will be connected between the Broadcasting Centre and the Kunduchi Transmitting Station in this equipment renewal plan.

- Japanese used cars are the majority in Dar es Salaam city and there are many commercial FM broadcasting stations under 90MHz that target these Japanese used cars. There are many cases of broadcasting relay interference now caused by the defective service of commercial FM broadcasting stations, and it is not suitable as a program link of a general service.
- RTD have registered 834 / 836 /838 / 840MHz of UHF wave as the

program links, and it is confirmed that 838 / 840MHz are not utilized currently.

- Line of sight between the Broadcasting Centre and the Kunduchi Transmitting Station will be achieved by the 50m transmitting side tower and the 30m receiving side tower.
- We will take the main standby system for transmitting line in this equipment renewal plan. The target of the signal to noise ratio is 65dB.

#### 4) The List of Planning Equipment

Name of Equipment	Quantity	Main Specification
<b>Kunduchi TX Station</b>		
(1) Programme Transmission	1Set	UHF Band 838MHz
Receiving Antenna	1	Parabolic type
Feeder	1	Coaxial Cable (Antenna ~ Receiver)
RF Divider	1	1 Input, 2 Output Type
Receiver	2	FM type
Equipment Rack	1	With Audio Jack Board and Inner Connection
Tower	1	Height : 32m
(2) Audio Input/Audio Monitor Equipment	1Set	
Audio Volume Control	2	Control Range more than 10dB
Limiting Amplifier	2	Compression Ratio 1/10 ~ 1/30 variable
Input Change-over Switch	1	Input 6, Output 1
Level Meter	1	VU meter type
Audio Monitor	1	Speaker
Equipment Rack	1	With Audio Jack Board and Inner Connection
(3) Transmitter	1Set	657kHz, 100kW Solid-state digital modulation Forced air cooling, and Operable in transmitting power reduction Lightning and Surge Protection
(4) Output Change-over Switch	1Set	150kW Capacity
(5) Dummy Load	1Set	150kW Capacity Forced air cooling
(6) Matching Equipment	1Set	150kW Capacity Indoor type

Name of Equipment	Quantity	Main Specification
(7) Feeder	1Set	6 wired feeder
Main Feeder	1	app. 200m length
Branch Feeder	1	app. 120m length
(8) Antenna Matching Hut	1Set	
RF Power Divider, Phase Adjuster	1	in door, East Matching Hut 150kW Capacity
Antenna Matching Unit	1	in door, East Matching Hut
East Matching Hut	1	
Antenna Matching Unit	1	in door, West Matching Hut
West Matching Hut	1	
(9) Transmitting Antenna	1Set	Directional antenna
Antenna, East	1	114m Height, guywire mast, anticorruption treatment
Antenna, West	1	114m Height, guywire mast, anticorruption treatment
(10) Radial Earth	1Set	
for Antenna, East	1	114m radius
for Antenna, West	1	114m radius
(11) Communication Equipment	1Set	VHF 150MHz Band
Duplex Antenna	1	for Fixed type Transceiver
Feeder	1	for Fixed type Transceiver
Transceiver	1	10W fixed type
Transceiver	1	10W moving type
(12) Electric Power Facilities	1Set	
Power Distribution Board	1	AC400/230V 4 wire, 3 phase 350kVA
Engine Generator	1	350KVA
Automatic Voltage Regulator	1	250KVA

Name of Equipment	Quantity	Main Specification
Broadcasting Center Studio Block		
Master Control Room Facilities		
(1) Programme Switcher	1Set	16 input, 5 output
(2) Line Equalizer	5	for Line Receiving, with Line transformer
(3) OB Relay Receiver	0	Existing Equipment

Name of Equipment	Quantity	Main Specification
(4) Audio Distribution Amplifier	1Set	more than 4 Output
(5) Limiting Amplifier	5	Compression Ratio 1/1 ~ 1/30 variable
(6) Line Amplifier	5	with Line Transformer
(7) Telephone Pick-up Unit	1	3 Input Line and Telephone
(8) Audio Equipment		
Digital Audio Tape Recorder/Re-producer	1	600 Balanced Output
Compact Cassette Tape Recorder/Re-producer	1	600 Balanced Output, Balance Input
Open reel Tape Recorder/Re-producer	1	19cm/sec & 38/sec Tape Speed
Logging Recorder	3	6 Hours Recording with one Tape S-VHS Type with VDA and Time Signal Generator
(9) Audio Monitor		
for Input of Programme Switcher	1	Input Select Switch 16 Input/with Level Meter
for Output of Programme Switcher	1	Input Select Switch 5 Input/with Level Meter
for General B'casting Monitor	1	Input Select Switch with 5 Input
for PRT B'casting Monitor	1	Input Select Switch with 5 Input
(10) Monitoring Receiver		
MF/HF Receiver (AF)	0	3 use of Existing Equipment
	1	
FM Receiver	0	1 use of Existing Equipment
	2	
Receiving Antenna	1Set	MF/HF Antenna 1, FM Antenna 1 with Distribution
(11) In House Monitor	1Set	
Power Amplifier	2	60W
Audio Speaker, Wall Mount	14	Rated Input 3W, Input Change-over SW with Volume Control, Hi-Impedance type
(12) Communication Equipment		
Room to Room Communication Equipment	9	Interphone
TX Station Communication Equipment	0	using Existing Equipment
	1	Rated 10W Transceiver with Antenna Feeder

Name of Equipment	Quantity	Main Specification
OB VAN Communication Equipment	0	using of Existing Transceiver
Station to Station Communication Equipment	0	using of Existing Magnet-type Telephone
(13) Clock System		
Master Clock	1	Sub Clock drive type and Time Signal Sound drive type
Sub Clock	23	Silent Type
(14) System Rack	3	With Audio Jack Board and Inner Connection
<b>【Others】</b>		
(1) On-air Lamp	1	LED Type
(2) Patching Cord	20	60cm×10, 30cm×10 with plug
(3) Head Phone	3	for Both Ears
(4) Chair	3	for Operation

Name of Equipment	Quantity	Main Specification
Broadcasting Center Studio Block		
Studio I Facilities	1 Set	
<b>【Studio Floor】</b>		
(1) Microphone		
Condenser Type	3	Uni/Omni Switchable Directional
Condenser Type	3	Uni/Omni/Bi Directional
Condenser Type	3	Uni (mic. axis) Directional
Condenser Type	3	Uni Directional
Electorate Condenser Type	3	Uni (mic. axis) Directional
Dynamic Type	4	Uni (mic. axis) Directional
(2) Microphone Stand		
Boom Stand	10	H:1.4m L:1.2m Adjustable type
Floor Stand	5	Gooseneck Type H:1.4 ~ 2m Variable
Table Stand	5	for on the Table type
Microphone Cable	15	with 5m cable CANNON XLR-3
Microphone Multi Cable	2	with 10m cable and 8P Multi Box CANNON XLR-3
(3) Speaker		

Name of Equipment	Quantity	Main Specification
Speaker	2	Speaker with Amplifier 300W, 2 way
Foldback Box	2	Output receiving Amplifier with 10m cable
Connector Panel (Mic)	4	4 Mic. Connector with recessed Box
Connector Panel (Monitor)	4	2 Spk. Connector with recessed Box
Earphone	8	for Single Ear Type
<b>【Sub Control Room】</b>		
(1) Audio Mixer	1	Input : Microphone Fader 14, Line (stereo) Fader 10 Output : Main line (stereo), Recording and Floor Line and Aux Line Group Fader Function and VU Meter
(2) Audio Equipment		
Compact Disc Player	1	Balanced Output 600
Mini Disc Recorder /Re-producer	1	Balanced Output 600 , Balanced Input
Digital Audio Tape Recorder/Re-producer	2	Balanced Output 600 , Balanced Input
Compact Cassette Tape Recorder/Re-producer	2	Balanced Output 600 , Balanced Input
Equipment Rack	2	Include Audio Monitor, Monitor Select switch, Audio Jack Board, Inner Connection
(3) Sound Effect Equipment		
Graphic Equalizer	2	2ch Balanced Input and Output XLR-3 Connector
Limiter/Compressor	1	2ch Balanced Input and Output XLR-3 Connector
Digital Effect	2	2ch Balanced Input and Output XLR-3 Connector
Effect Equipment Rack	1	Include Audio Jack Board and Inner Connection
(4) Monitoring Equipment		
Audio Monitor	2	2 way with Amplifier, 300W
Headphone	5	for Both Ears
(5) System Rack		
Audio Distribution Equipment	1 Set	1 Input 4 Output Distribution
System Rack	1	Include Audio Jack Board and Inner Connection
<b>【Others】</b>		
(1) On-Air Lamp	3	LED Type
(2) Patching Cord	30	60cm×10、 30cm×10 with plug
(3) Chair	3	for Programme Production

Name of Equipment	Quantity	Main Specification
<b>Broadcasting Center Studio Block</b>		
<b>Studio II Facilities</b>		
<b>【Studio Floor】</b>		
(1) Microphone		Same Specification Studio I
Condenser Type	2	Uni/Omni Switchable Directional
Condenser Type	2	Uni/Omni/Bi Directional
Condenser Type	2	Uni (mic. axis) Directional
Condenser Type	2	Uni Directional
Dynamic Type	2	Uni (mic. axis) Directional
(2) Microphone Stand		Same Specification Studio I
Boom Stand	4	H: 1.4m L: 1.2m Adjustable Type
Floor Stand	2	Gooseneck Type H: 1.4 ~ 2m Variable
Table Stand	2	for on the Table type
Microphone Cable	15	with 5m cable CANNON XLR-3
Microphone Cable	10	with 10m cable CANNON XLR-3
(3) Speaker		Same Specification Studio I
Speaker	2	Speaker with Amplifier 300W, 2 way
Connector Panel (Mic)	2	4 Mic. Connector with recessed Box
Connector Panel (Monitor)	2	2 Spk. Connector with recessed Box
Earphone	2	for Single Ear
<b>【Sub Control Room】</b>		
(1) Audio Mixer	1	Input : Microphone Max 6, Line (stereo) 10, Total 16 Output : Main line (stereo) 1, Recording Line, Floor Line and Aux Line, Group Fader Function and VU Meter
(2) Audio Equipment		
Compact Disc Player	1	Balanced Output 600
Mini Disc Recorder /Re-producer	1	Balanced Output 600 , Balanced Input
Digital Audio Tape Recorder/Re-producer	2	Balanced Output 600 , Balanced Input
Compact Cassette Tape Recorder/Re-producer	2	Blanced Output 600 , Balanced Input



Name of Equipment	Quantity	Main Specification
Equipment Rack	2	Include Audio Monitor, Monitor select switch, Audio Jack Board, Inner Connection
(3) Sound Effect Equipment		Same Specification Studio I
Graphic Equalizer	2	2ch Balanced Input and Output XLR-3 Connector
Limiter/Compressor	1	2ch Balanced Input and Output XLR-3 Connector
Digital Effect	2	2ch Balanced Input and Output XLR-3 Connector
Effect Equipment Rack	1	Include Audio Jack Board and Inner Connection
(4) Monitoring Equipment		Same Specific ation Studio I
Audio Monitor	2	2 way with Amplifier, 300W
Headphone	5	for both ears
(5) System Rack		Same Specification Studio I
Audio Distribution Equipment	1Set	1 Input 4 Output distribution
System Rack	1	Include Audio Jack Board and Inner Connection
<b>【Others】</b>		
(1) On-air Lamp	3	LED Type
(2) Patching Cord	20	60cm×10, 30cm×10 with plug
(3) Chair	3	for Programme Production

Name of Equipment	Quantity	Main Specification
Broadcasting Center Studio Block		
Studio III, IV V Facilities		Studio III, IV V Common Specification
<b>【Studio Floor】</b>		
(1) Microphone		Same Specification Studio I
Condenser Type	2	Uni/Omni Switchable Directional
Dynamic Type	2	Uni (mic. axis) Directional
Dynamic Type	1	Both Directional
(2) Microphone Stand		Same Specification Studio I
Boom Stand	2	H: 1.4 L: 1.2m Adjustable Type
Floor Stand	2	Gooseneck Type H: 1.4 ~ 2m Variable
Table Stand	-	for on the Table Type
Microphone Cable	15	with 5m cable CANNON XLR-3
Microphone Cable	10	with 10m cable CANNON XLR-3

Name of Equipment	Quantity	Main Specification
Cough Box	2	Cough, Back talk, Tally output cue, On-air, S.By Displays
(3) Speaker		Same Specification Studio I
Speaker	2	Speaker with Amplifier 300W, 2 way
Connector Panel (Mic)	2	4 Mic. Connector with recessed Box
Connector Panel (Monitor)	2	2 Spk. Connector with recessed Box
Connector Panel (Cough Box)	2	Cough Box Connector with recessed Box
(4) Table	1	for announcers
(5) Chair	2	for announcers and guests
<b>【Sub Control Room】</b>		
(1) Audio Mixer	1	Input : Microphone Max 6, Line (stereo) 10, Total 16 Output : Main line (stereo) 1, Recording Line, Floor Line and Aux Line, Group Fader Function and VU Meter
(2) Audio Equipment		Same Specification Studio I
Compact Disc Player	1	Balanced Output 600
Mini Disc Recorder /Re-producer	1	Balanced Output 600 , Balanced Input
Digital Audio Tape Recorder/Re-producer	2	Balanced Output 600 , Balanced Input
Compact Cassette Tape Recorder/Re-producer	2	Balanced Output 600 , Balanced Input
Equipment Rack	2	Include Audio Monitor, Monitor Select Switch, Audio Jack Board, Inner Connection
Disk Player	1	33, 45 RPM
Open-Reel Tape Recorder /Re-Producer	1	Tape Speed 19cm/sec and 38cm/sec
Telephone Pick-up Unit	1	3 Input Line and Telephone
(3) Monitoring Equipment		Same Specification Studio I
Audio Monitor	2	2 way with Amplifier, 300W
Headphone	5	for Both Ears
(4) System Rack		Same Specification Studio I
Audio Distribution Equipment	1 Set	1 Input 4 Output Distribution
System Rack	1	Include Audio Jack Board and Inner Connection

Name of Equipment	Quantity	Main Specification
<b>【Others】</b>		
(1) On-air Lamp	3	LED Type
(2) Patching Cord	20	60cm×10, 30cm×10 with plug
(3) Chair	3	for Programme Production

Name of Equipment	Quantity	Main Specification
Broadcasting Center Studio Block		
Programme Transmission Equipment	1Set	UHF Band 838MHz
Input Divider	1	Dividing Pad
UHF Transmitter	2	Tx 1and TX 2 10W
TX Output Change-over Switch	1	Dividing Switch
Feeder	1	Coaxial Cable (Transmitter ~ Antenna)
Transmitting Antenna	1	Parabolic Type
Equipment Rack	1	with Audio Jack board and Inner Connection
Tower	1	height: 52m

Name of Equipment	Quantity	Main Specification
Broadcasting Center Studio Block		
Electric Power Facilities		
Power Distribution Board	1	AC400/230V 4Wire, 3Phase, 270KVA
Engine Generator	1	270KVA
Automatic Voltage Regulator	1	60KVA
UPS (Uninterrupted Power Supply)	1	10KVA

Name of Equipment	Quantity	Main Specification
Broadcasting Center Studio Block		
Common Equipment		
(1) Test Equipment		
Audio Character Test Equipment	2	Audio Band, Oscillator, Level meter, Distortion rate
Variable Attenuator	2	Audio Band
Frequency Counter	1	DC ~ 1,000MHz
Amplitude Modulation Meter	1	Input Impeadance 50
Oscilloscope	2	100MHz 2 Channel 2mV ~ 100V

Name of Equipment	Quantity	Main Specification
Circuit Tester	4	DC:0 ~ 1,200V AC: 0 ~ 1,200V R:0 ~ 20,000k
Frequency OSC	1	Medium Wave Band Check
Frequency Bridge	1	Medium Wave Band Check
Field Strength Meter	1	Medium Wave Band Check
RF Oscillator	1	Ultra High Frequency Band
Spectrum Analyzer	1	Portable type 9kHz ~ 3GHz
Fixed Attenuator Pad	1	Ultra High Frequency Band
Variable Attenuator	1	Ultra High Frequency Band
Dummy Load	1	Ultra High Frequency Band
Directional Coupler	1	Ultra High Frequency Band
Electric Voltmeter	2	DC: 200mV ~ 1,000V AC: 200mV~ 500V
Meager Tester	2	Battery Type 500V/1000M
Clump Meter	2	DC/AC Compact Type
Earth Meter	1	Direct Reading type 200/2,000 Change-over
(2) Tool Set	7Sets	A set×2, B set×5
Tool Type A	2Sets	30 Items Tool for Studio and Transmitting Station
Tool Type B	5Sets	15 Items for each Studios
(3) Audio Standard Tape	2 Sets	CD, DAT, MD, CCT, ORT for check Standard Tape
(4) Spare-part for Studio	1Set	Refer to 2-3-2 (f) b)
for Transmitter site	1Set	Refer to 2-3-2 (f) b)
(5) Install Materials	1Set	Audio Cable, Control Cable, Power Cable and Various Connectors

## (2) Building Plan

### 1) Site Layout Plan

#### (a) Present Status of Construction Sites

##### a) Site for Kunduchi Transmitting Station Building

The site is about 950m long in north-south direction and 490m wide in east-west direction and has a shape with each corner of a rectangle cut off diagonally, and its total area is about 44.6 hectare. The aforementioned approach road is connected to the existing transmitting station building

located at the northern part of the premises. Two 114m-high directional antenna steel towers are built directly south of the building. The site gently declines from its south side to north side and also slopes gently from the north-south centerline in both east and west direction. The central area of the site's southern boundary line is highest at an elevation of 74m from the sea level and is about 20m higher than the lowest area near the northwestern boundary.

The construction site of the new transmitting station building shall be the area adjoining the eastern boundary and shall be 50m long in north-south direction and 70m wide in east-west direction. In addition to being relatively flat and being suited for construction of buildings, it has many advantages in terms of construction in the light of existence of commercial power and telephone lines for the existing transmitting station along the approach road.

Service water has already been extended to the area near the northeastern boundary of the site according to the request from RTD and will be led into the existing transmitting station building. Therefore, water supply to the new transmitting station building can be realized by branching off from this channel. Since sewage facility is not available, in-site treatment system using septic tank and soak pit will be used for wastewater.

b) Site for RTD New Studio Block

The existing RTD Broadcasting Centre is located in the northeastern section of Dar es Salaam along Nyerere Road, which is one of the main roads in the city. A wide trapezoid-shaped site with an area of about 1.8 hectares is surrounded by a 3-meter high boundary walls and have gardens with sufficient space on the front side facing the road. After the administration block and studio block were built in 1954 by assistance from United Kingdom, office blocks, a workshop, a training blocks and a cafeteria, etc. have been built around the studio block. All of these facilities are concentrated in the south section of the premises.

At the south part of the existing site is a vast vacant land (120-180m wide and approximate 280m long, with total area of about 4.5 hectares) owned by RTD. The vacant land slopes gently, dropping about 3m from the

wall surrounding the existing facilities in the north towards the southern end of the property. It has been reported that the depression neat the southern end collects water and turns into a pond during the rainy season. Based on the request from RTD, the construction site for the new studio block shall be allotted in the area of this vacant lot that is close to the existing buildings and adjoins the south side boundary walls. The area, having trapezoid-shape and 50m long, is suitable since it is occupied in the highest level of the vacant lot.

Leading commercial power into the new studio block is rather easy as it has already been supplied to the existing buildings from two directions, i.e. from the direction of Sanza Road that runs on the east side of the road and along the south side boundary walls.

City water is not available in the area surrounding the RTD Studio Centre. Water for the existing buildings comes from the well provided near the north entrance gate in the front yard. Therefore, water supply to the new studio building will be performed by extending the route for present water supply. Since sewage facility is also not available, in-site treatment system using septic tank and soak pit will be used for treating wastewater as the existing buildings do so.

(b) Building Layout Plan

a) Kunduchi Transmitting Station Building

A two meter high feeder rack and its supporting poles will be built between the transmitting antenna (which will be newly built about 250m south of the transmitting station building) and the transmitting station building. Therefore, the transmitting station building shall be placed on the south side of the site and the front entrance shall face the approach road on the north side of the site because a path line that would intersect with the feeder route shall not be secured between them.

Site layout plan of Kunduchi Transmitting Station Building is shown in Fig. 2-3-17 and 2-3-18.

b) RTD New Studio Block

The following items can be cited as the basic principles related to the requests from RTD side regarding layout plan for the new studio building.

- Access to the new studio building shall be limited to the existing entry gate for the purpose of security inside the buildings. Therefore, the entrance to the new studio building shall face north as the administration block faces north side entrance gate, extending the road in the premises that detours from the existing buildings to the west to secure access to the new studio building.
- The existing connecting corridor shall be extended to the new building by Tanzanian side so that it would be possible to make it easy to go back and forth between the building even on rainy days.
- The connecting corridor shall also be used as electrical wiring route from the existing studio, and Transmission Room in the new studio building and self-supported steel tower for program transmission shall be located relatively close to the connecting corridor.

Based on these basic principles, the building shall be placed parallel to the existing training block and office building that are located in the front of the new studio building with its long side parallel to east-west direction. Since the building is a closed radio facility with few openings on the outer wall, this layout is also effective from the viewpoint of reducing the area of the building that receives afternoon sun. In addition, the existing connecting corridor located on the eastside of the site shall be extended in straight line to minimize path line distance. Position of the building shall be decided in such a way that entry to the new studio building from the corridor will be made from the eastern end of the building.

Building Layout Plan of RTD New Studio Block is shown in Fig. 2-3-20.

(c) Exterior Plan

a) Kunduchi Transmitting Station Building

A macadam-paved road and parking space shall be built in the front yard on north side of the building. In addition, a small guardhouse having about 2m square plane shall be built by the entrance gate. These external works shall be conducted by Tanzanian side. The self-supporting steel tower for program transmission shall be built near the eastern boundary of the transmitting station. It is because that the angle formed by the line

connecting the center of the tower and the direction of RTD Broadcasting Centre (south-southeast) and the line connecting the center of the tower and the center of two transmission antennas shall ideally be maximized for transmission purposes.

As the construction work for the antenna-matching hut, the construction of net fences for this transmitting station building needs to be completed at the same time as the completion of the construction, from the viewpoint of security. Relocation of power line and telephone line as well as connection of commercial and leading city water into the building shall also be performed by the Tanzanian side.

b) RTD New Studio Block

Northern part of the building shall be secured, as front yard with car access and parking space shall be built beside the entrance. These roads on the premises shall be paved using macadam and connected to the existing road on the premises by running through the western side of the site.

The new connecting corridor shall be built on the eastern end of the building and provide access to the hallway to the central area of the building. Its roof shall be covered with corrugated cement sheet (non-asbestos type) like existing corridor and the floor shall be covered with pre-cast concrete plate. This floor material shall also be used for the sidewalk in front of the building and offer access from the connecting corridor to the main entrance located on the west side of the building.

The 30 to 40m deep vacant space created between the connecting corridor and the site boundary on the east side shall be utilized as the spaces for the self-supporting steel tower for program transmission and as utility space for placing engine generator, oil tank, receiving tank, pump and septic tank. In addition, an emergency gate that would enable direct entry from the road on the eastside of the site shall be installed. Moreover, a macadam-paved open space for vehicle approach and turnaround shall be provided, since the connecting corridor would obstruct the entry of oil trucks that bring in the fuel for power generator and water wagons in case the well runs dry. The existing wall located at the south side of the existing buildings shall be used as a buffer wall. It would reduce the



negative effect of noise and vibration generated during the building construction period on the existing studio and shall be removed at the time of external works immediately before completion. Removal of this wall, provision of macadam paved driveway and parking space, emergency entry gate and construction of new boundary walls for marking off the construction site for the new studio building and relocation of power line along the south side boundary walls shall be carried out by the Tanzanian side.

## 2) Architectural Plan

### (a) Floor Plan

#### a) Kunduchi Transmitting Station Building

The basic policy of floor plan for Kunduchi Transmitting Station Building is as shown below.

- In view of the building function and scale of the radio transmission, the building shall be a one-storied building having approximately the same area and room configuration as the existing transmitting station building.
- Clear zoning shall be sought by designating the rooms to left and right of north entrance hall as office zone for staffs and south side of the building close to the transmission antenna as equipment room zone. However, a manager room shall be located in the equipment room zone next to the transmitter room to allow for constant monitoring of the equipment.
- A control room shall be located adjoining the center of transmitter room so that the entire room can be overlooked and the two rooms shall be partitioned by glass screen.
- Power receiving and transforming room (TANESCO Room) shall be incorporated inside the building same as the existing building. In addition, an emergency engine generator shall be installed inside the building for security reasons as the noise and vibration generated by the generator will not become a significant demerit in terms of the building functions.

The function of each room in Kunduchi Transmitting Station Building and the room areas calculation bases are shown in Table 2-3-4, and the floor plan of Kunduchi Transmitting Station Building is shown in Fig. 2-3-19.

b) RTD New Studio Block

The basic policy of the new studio building in terms of floor plan is as shown in the following.

- Rooms comprising the studio block shall be limited to five studios to which the introduction of supplied equipment has been requested, control rooms attached to them and various functional rooms that are minimally required for programme production and shall not include offices of the staffs.
- Path line inside the building including the connection with existing buildings via connecting corridor shall be simple and clear, and comings and goings with existing buildings and access between respective rooms in the building shall be easy.
- The building shall be planned as a two-storied building from the viewpoint of seeking effective utilization of vacant space with consideration for future extension and reduction of construction cost, and from the design viewpoint of securing the building's sense of existence surrounded by high boundary walls.
- It is expected that musical equipment will be brought into the large studio and that it will be visited by large number of performers. Therefore, this studio and two medium-sized studios shall be located on the ground floor and three small studios shall be placed on the first floor. The large studio shall be placed at the western end of the building by extruding from the building (refer to the Sectional Plan).
- Each floor shall have a waiting area where performers can browse through scripts and take breaks.
- A maintenance room shall be provided on the ground floor for the purpose of repairing the supplied equipment and the existing equipment to be moved to the new studio building. In addition, an equipment store for storing spare parts for supplied equipment shall be provided next to this room.
- The space for holding programme production meetings is not available near the studio in existing studio block and is clearly

causing inconvenience. Therefore, a meeting room for programme production with minimum appropriate space shall be provided. In view of the layout plan of each studio, this studio shall be located on the southwestern corner of the first floor.

- A transmission room shall be placed at the northeastern corner of the first floor for the purpose of minimizing feeder loss to the self-supporting steel tower for programme transmission with a master control room located next to it.
- An engine generator, which is the source of noise and vibration, shall not be installed inside the building and located as away from the studio as possible.

The function of each room in the new studio building and the room areas calculation bases are shown in Table 2-3-4, and the floor plans of RTD New Studio Block are shown in Fig. 2-3-21 and 2-3-22.

**Table 2-3-4 Function of Each Room and Bases of Floor Area Calculation  
for New Buildings**

Name of Room	Function	Planned Floor Area (m <sup>2</sup> )	Bases of Floor Area Calculation	
<b>Kunduchi Transmitting Station Building</b>				
Ground Floor	Entrance Hall		10.5	Set as minimum adequate space
	Manager Room	Business and reception for guests by the director	18.0	Space available at existing transmitting station with consideration for additional reception space
	Sub-Manager Room	Business by the assistant director	13.5	Conforming to the space available for the same room at existing transmitting station
	Reception Room	Business by typist cum secretary	10.5	Conforming to the space available for the same room at existing transmitting station
	Control Room	Monitoring and adjustment of transmission equipment	36.0	Set according to the required equipment and number of employees
	Night Duty Room	Cat napping of night-shift workers	13.5	Bed for 3 persons and locker space
	Transmitter Room	Accommodation of transmission equipment	69.0	According to the layout of required equipment
	Storage	Storage of materials, equipment and tools	36.0	Determined from the manner in which the existing studio facility is used
	Dummy Load Room	Accommodation of dummy load	15.8	According to the layout of required equipment
	Sand Trap Room	Sand barrier for dummy load room	5.3	Set as minimum adequate space
	TANESCO Room	Accommodation of receiving and transforming facilities	18.0	Conforming to the space available for the same room at existing transmitting station
	Electricity Room	Accommodation of power generators	18.0	According to the layout of required equipment
	Generator Room	Rest area for employees	36.0	According to the layout of required equipment
	Kitchen		13.5	Determined from the manner in which the existing studio facility is used
	Women's Toilet		6.0	Set as minimum adequate space
	Men's Toilet		4.3	Set as minimum adequate space
	Corridor		30.1	
	Total floor area	354.0		
<b>RTD New Studio Block</b>				
Ground Floor	Entrance Hall		37.1	Set as minimum adequate space
	Studio I	Studio capable of music program production	112.9	Standard value set according to the content of program produced
	Sub-Control Room for Studio I	Switching and adjustment of audio during program recording	51.5	According to layout of required equipment
	Studio II	Production studio for discussion and lecture programmes	63.2	Standard value set according to the content of program produced
	Sub-Control Room for Studio II	Switching and adjustment of audio during programme recording	38.4	According to layout of required equipment
	Maintenance Room	Repair and adjustment of various equipment	41.1	Conforming to existing studio facilities
	Machine Room	Accommodation of power receiving facility and air conditioning air supply fan	58.6	According to layout of required equipment
	Equipment Store	Storage of spare parts for supplied equipment	16.0	Determined from the manner in which the existing studio facility is used
	Storage	Storage of facility supplies	7.5	Determined from the manner in which the existing studio facility is used
	Waiting Area	Stand-by of performers and temporary reception of visitors	20.1	Set as minimum adequate space

Name of Room		Function	Planned Floor Area (m <sup>2</sup> )	Bases of Floor Area Calculation
First Floor	Studio II	Program production studio for announcements and talks	31.7	Standard value set from the content of programs produced (about 30m <sup>2</sup> )
	Sub-Control Room for Studio III	Switching and adjustment of audio during program recording	29.7	According to layout of required equipment
	Studio IV	Program production studio for announcements and talks	30.7	Standard value set from the content of programs produced (about 30m <sup>2</sup> )
	Sub-Control Room for Studio IV	Switching and adjustment of audio during program	28.8	According to layout of required equipment
	Studio V	Program production studio for announcements and talks	31.2	Standard value set from the content of programs produced (about 30m <sup>2</sup> )
	Sub-Control Room for Studio V	Switching and adjustment of audio during program	29.3	According to layout of required equipment
	Program production meeting room	Meeting for program production and editing	36.6	Determined from the manner in which the existing studio facility is used
	Master Control Room	Accommodation of program sending facility	27.7	According to layout of required equipment
	Transmission Room	Accommodation of program transmission equipment	24.8	According to layout of required equipment
	Store	Storage of facility supplies	14.4	Determined from the manner in which the existing studio facility is used
	Kitchen	Accommodation of water boiling apparatus and tea set	7.5	Set as minimum adequate space
	Waiting Area	Stand-by of performers and temporary reception of visitors	20.5	Set as minimum adequate space
Common	Men's Toilet	16.0 × 2 =	32.0	Set as minimum adequate space
	Women's Toilet	12.0 × 2 =	24.0	Set as minimum adequate space
	Corridor, Staircase, etc.		193.2	
Total floor area			1008.5	

(b) Sectional Plan

a) Kunduchi Transmitting Station Building

The frame for the roof of Kunduchi Transmitting Station Building was examined in the same manner as above. While closed cooling system by air-conditioners will be introduced in the building, ventilation system in the event of emergency is also considered in design of the building. An exhaust duct is connected to the upper part of the wall on the gable of the building and air ventilation grilles of considerable size would be required. It was confirmed that use of the roof frame system as the one used in the new studio building would not be economical as it would increase the size of structural framework as a result of having to raise the floor height to 6m for a height of about 4m. Therefore, the second option in the preceding paragraph, i.e. the sloped concrete roof slab, shall be adopted.

Elevations and sectional drawings of Kunduchi Transmitting Station Building are shown in Fig. 2-3-19.

b) RTD New Studio Block

Studio accounts for the majority of rooms comprising the new studio building and the floor height of the building is determined by the height of rooms that are needed for these studios. Among the five studios that are included in the new building, the large studio requires a ceiling height of about 4.5m while the medium and small studios need ceiling height of about 3m. The large studio and medium/small studios need floor height of approximate 6m and 4.5m, respectively, considering the room for sound insulation in the ceiling, duct space for air conditioning and height of the structural beams determined by structure spacing. In addition, adjunct control rooms and other required rooms can be properly included under the same floor height as medium/small studios.

Based on the points mentioned above, the most clear-cut and economical method of construction would be to set the standard floor height for the building at approximate 4.5m. As for the large studio, it is the only room that requires floor height of a little over 6m, will be located at the end of the building, extruding from the rest of the structure. This is why only the large studio sticks out as a one-storied structure on the west side of the building as far as possible from the location of power generator.

The following three methods were examined for framing of the roof.

Concrete flat roof slab with waterproofing

Sloped concrete roof slab with roof tiles using simple waterproofing treatment

Truss framing on concrete flat slab and roof tiles setting on the frames

Among the three options mentioned above, the first option was abandoned because there was no reliable contractor in Tanzania, who could carry out waterproofing work at their own responsibility and offer maintenance service. The second option lacks structural clarity and has poor workability, as it required an inner wall more than 10m high to support the top of sloped roof. The third option has merits in terms of workability, economic efficiency and securing of sound insulation at the studios. The third option shall therefore be adopted.

Simple floating floor method using vibration-proof rubber shall be used for the floor in each studio for the purpose of maintaining the required sound insulation performance. In addition, the control rooms adjoining the studios shall have free-access floors for the purpose of simplifying various wiring with the studio. Therefore, the floor slab for these rooms shall be concreted at a level about 200mm lower than other structural slabs. Elevations and sectional drawings of RTD New Studio Block are shown in Fig. 2-3-23 and 2-3-24.

### 3) Structural plan

#### (a) Foundation Structure

According to sub-soil investigation report, the geology near the surface of the ground at the site for RTD New Studio Block mainly consists of sandy soil. On the other hand, it consists sandy clay soil in which fifty-fifty mixture of fine grains of clay/silt and coarse grains of sand/stone. Both sites have almost same bearing capacity of soil and it is expected as minimum 10t/sq.m. at the depths of 1.5m or more. The capacity makes it possible to use direct foundation method for both buildings.

#### (b) Structural Framing

Rigid framed reinforced concrete, which are applied, as conventional structural method in Tanzania, shall be adopted for both the new buildings. The former shall be planned as two-storied structure and the latter single story structure.

#### (c) Setting of Design Loads and External Forces

The Ministry of Works, which issues permits and approvals for structures in Tanzania, does not have its own clear standard regarding structural design. It is the ordinary practice that structural load is set up, by qualified structural engineer, based on weather records and characteristics of the building, and then the authority examine and approve the design report project by project without any strict regulations to be referred.

Setting of loads in structural design for the Project shall appropriately be made based on the natural and weather conditions in Tanzania.

a) Dead Load

The total weight of the building based on relative density of component materials shall be calculated as live loads.

b) Live Load

The live loads in studio as well as related rooms where the equipment are to be installed shall be calculated by actual loads of the equipment. Ad for other rooms, it shall be determined by using the results from similar buildings as reference.

c) Wind Load

The designed wind velocity shall be determined in accordance with the local standard which is generally adopted according to height of the building.

d) Seismic Load

According to the above BRT guideline, areas where the new buildings will be constructed both belong to Zone 1 of earthquake risk level (ground acceleration coefficient = 0.025). To calculate the seismic load according to this information in view of the building structural system, scale, importance and ground conditions, standard shearing force coefficient would be less than 0.1. The safe side value of 0.1 shall be used as the coefficient.

4) Electric Installation

(a) Power Receiving and Transforming Facility

In accordance with the Japanese grant aid system, power will be connected to the buildings as major part of the work to be carried out by the Government of Tanzania. The content of work includes the following;

- Relocation of existing power line to the new demarcation line around the new studio building
- Installation of pole-mounted transformer
- Leading the secondary side (low voltage side) onward to the electricity room of the new studio building by using three-phase, four-line 400/230 V,



50 Hz system

- Installation/connection to the main circuit breaker and watt-hour meter in the electricity room.

At Kunduchi Transmitting Station Building, it is necessary to relocate or newly install transformer inside the new station building and install/connect the main circuit breaker and watt-hour meter in the electricity room.

Electrical installation from the main circuit breaker onward is the work to be carried out by the Government of Japan. Low voltage main switchboard will be installed in the electricity room to supply electricity for each system such as broadcasting equipment, studio lighting, ordinary lighting fixtures, socket outlets, air-conditioning and water supply, drainage and sanitary systems. Switchboards shall be of closed type in view of safety, reliability and ease of work and maintenance.

(b) Emergency Power Supply

The emergency engine generator shall be of battery typed automatic starting system that runs at three-phase, four-line 400/230 V, 50 Hz, and shall have the capacity suitable for the entire load of facilities incidental to the building and broadcasting equipment. Due to the noise and vibration arising from the generator, it shall be canopy type and placed away from the building in the new studio building.

In view of easy maintenance and prevention from settlement, oil tanks for the generator shall be ground-mounted type. The capacity of oil tanks shall cover three days continuous power failure, i.e., covering for 57 hours operation in the new studio building (19 hours/day multiplied by 3 days).

(c) Main Feeder System

The main feeders shall be divided according to purposes for respective building equipment, such as socket outlets, air-conditioning equipment, etc., and shall be laid by using steel conduit pipes, hard vinyl chloride pipe or wiring method on cable rack. These power lines shall be wired to avoid coming close to or crossing with broadcasting equipment and its wiring for the sake of preventing electromagnetic conduction and interference, etc. to broadcasting equipment. In order to keep high reliability in air-conditioning system, power for the

system shall be supplied via automatic voltage regulator (AVR).

(d) Lighting Fixtures

While JIS standard shall be applied correspondingly for the designed illumination standard in each room, it shall be set at a slightly lower level as follows, in view of the overall condition in the country.

- Studio, sub-control rooms, master control room, maintenance room, meeting room, etc.: 300-400lx
- Transmission room, waiting areas, machine room, equipment store, etc.: 200-300lx
- Entrance hall, toilets, kitchen, staircase, stores, corridors, etc.: 100-200lx

The sub-control room and master control room in the new studio building shall be equipped with lighting fixtures with considerations for prevention of glare. In addition, there shall be a dimmer system with spotlight on the control desk in the room. The connecting corridor shall have waterproofed lighting appliances. There shall also be a street light around the studio building and lighting facility at the entrance of generator hut.

Emergency lights and evacuation guiding lights shall be installed more or less according to the Japanese standard. Storage battery type emergency light that constantly recharges itself and automatically goes on in the event of power failure shall be placed at important positions of the evacuation route to secure minimum illumination.

Lighting fixtures at Kunduchi Transmitting Station Building shall also be comparable to these.

(e) Socket Outlets

Socket outlets shall be installed according to functions of each room at both buildings. While the shape and specifications of the socket shall conform to BS standard as a rule, those generally sold in Tanzania shall be used as much as possible as they tend to be of expendable nature.

(f) Telephone Conduits

An outlet box for telephone shall be fixed at maintenance room and master control room of the new studio building in addition to provision of telephone conduits from telephone terminal board to each telephone outlet box. At Kunduchi transmitting station building, telephone outlet boxes shall be installed at manager room, sub-manager room, secretary room and control room so that telephone can be installed at these rooms and perform conduits connection between terminal boxes and from terminal boxes to telephone outlets.

Wiring in conduits and installation of telephones shall be carried out by Tanzanian side.

(g) Television Conduits

It is likely that television will be installed at waiting areas on each floor and meeting room after the delivery of the new studio building. Outlet for collective television viewing and conduits for that purpose shall be installed at proper location of each room or space.

(h) Special Facilities for Broadcasting Equipment

Switchboard for broadcasting equipment shall be installed at required positions of master control room, transmission room and maintenance room of the new studio building for power supply purposes.

In addition, the on-air display lamps to be supplied as a part of the equipment shall be placed at the entrance of each studio and adjunct sub-control room. Therefore, it is necessary to mount a box for installing on-air display lamp at these locations and make conduit piping available from master control room.

In addition, mounting boxes for master clock, sub clock, interphone, wall mounted speakers, microphones, socket plate for speakers that are supplied on the equipment side shall be installed at each room where such equipment is installed in addition to conduit piping from the master control room. Automatic voltage regulator (AVR) and uninterruptible power supply (UPS) that are indispensable as power facilities for broadcasting equipment shall be supplied and installed on the broadcasting equipment side. These facilities shall be stored at machine room.

(i) Fire Alarm System

Fire alarm system shall be introduced at main rooms in both the new studio building and Kunduchi transmitting station building in view of importance of broadcasting facility. Photoelectric smoke detectors shall generally be used as fire detectors, and the rooms with heat and smoke generation shall be equipped with heat detectors. Fire alarm control panel shall be placed at rooms where staff is posted at all times, e.g, master control room in the new studio building and at control room in Kunduchi transmitting station building.

(j) Grounding System

Grounding system shall be connected to coupled grounding rod (14mm diameter and 1500mm long) as a rule. Copper plate system (1.5t – 900 × 900mm) or combined system shall be used depending on purposes. Collective grounding terminal board shall be installed in master control room. Required earth resistance by type of facilities shall be as follows, and their grounding shall be installed independently.

· For engine generators	4	or less
· For arrestors	4	or less
· For power	4	or less
· For broadcasting equipment	10	or less
· For telephone	10	or less
· For lighting rod	10	or less

(k) Electrical Requirement for Tower

Self-supporting steel towers shall be equipped with obstruction lights and lamps for ladders. Lighting rod facility, grounding facility and the above lighting shall be performed as a part of tower construction work.

5) Water Supply and Drainage System

(a) Water Supply System

Putrefaction prevention measures will not be taken for water supply system in the buildings since the water will not be used for drinking. Existing elevated water tank using the existing well shall be used as water source at the new studio building. By adopting a method that diverts water supply pipe into the

new studio building by branching out the feed pipe from this water tank and leading the water into the new studio building. In addition, a system that enables replenishment by water tank lorry shall be installed as a measure against water shortage at the existing well. Both the additional receiving tank and feed pump shall be installed outdoors and the receiving tank shall be made of in-situ concrete. Feeding from the pump shall be realized by pressurized feeding method that does not require an elevated tank.

As for Kunduchi transmitting station building, water shall be drawn in from the existing city water pipe and drawn into the receiving tank installed outside the new building. The same specifications and methods as the new studio building shall be adopted for both the receiving tank and the feeding pump.

(b) Hot Water Supply

It shall be achieved by installing wall socket outlets for electric pots. Electric heaters shall not be used.

(c) Sanitary Fixtures

The number of sanitary fixtures corresponding to capacity shall be installed at both buildings. Toilets shall be equipped with such fixtures as toilet bowls, urinals, lavatories and sinks for cleaning tools and with accessories such as toilet paper holders. Western type toilet bowls shall be used.

(d) Drainage System

Since both construction sites are not equipped with sewage facility, wastewater shall be treated within their premises. Drainage from the building shall be separated into sewage and miscellaneous drainage and shall be lead to the soak pits after putting through merging treatment at the septic tank. The septic tank shall be of contact aeration type for ease of maintenance and made of in-situ concrete for smallness of scale.

(e) Refueling System for Engine Generator

The oil tank for emergency engine generator shall be installed on the ground in view of maintenance and prevention of subsidence. The tank capacity shall be sufficient to withstand three days of power failure, assuming that the facility will be operating 57 hours total (19 hours a day for three days.)

(f) Fire Extinguishers

Fire extinguishers shall be of a type that can cope with fires occurring at general combustibles such as buildings, fire, electric facilities and hazardous items. The required capacity unit shall be secured and placed at respective areas in the building to maintain position suited for initial fire extinguishing and installing intervals.

6) Air Conditioning and Ventilation System

(a) Air Conditioning System

a) Kunduchi Transmitting Station Building

Air conditioning system for the Kunduchi transmitting station building shall be of air-cooled floor mounted packaged type. A total of three units shall be installed, and two units shall be run at all times and the remaining unit shall be used as spare for improved reliability. In addition, the air conditioning equipment shall have the system that recovers automatically when commercial power is recovered after power failure. However, the staff stationed within the buildings shall switch alternate operation of three units manually. A system that can manually start up the ventilation system shall be used in conjunction as a measure in the event all air conditioners fail to operate.

Rooms such as manager room, sub-manager room, control room and night duty room shall have separate type air conditioning units.

It is quite essential in radio studio building that intrusion of noise or vibration to the studio room shall be protected as much as possible. Target allowable NC (Noise Criteria)-value shall be 25 for studios, 30 for sub-control room and 35 for master control rooms and other relevant rooms.

b) RTD New Studio Block

It is extremely important to properly maintain the environment surrounding programme production and broadcasting equipment for the purpose of securing their quality and reliability. Introduction of air conditioning system is indispensable in the buildings for preserving the working environment of the employees in the climate of Tanzania that remains hot and humid throughout the year. Air conditioning system

shall be installed at each studio and rooms that are attached to them as well as meeting room and maintenance room.

The air conditioning equipment in the new studio building shall be the multiple type for air-cooling building that shares the outdoor equipment to reduce construction and running cost and to cut down on the content of work in terms of duct space. Fresh air shall be supplied via heat exchanger for the sake of energy conservation.

(b) Ventilation System

Ventilation facility shall be installed on rooms affected by heat, dust, humidity and odor at both facilities. Method of ventilation shall be of mechanical supply and exhaust ventilation method. Names of rooms in which mechanical ventilation system shall be introduced and the number of ventilation shall be as follows.

- Toilet, Kitchen: 10 times
- Machine Room: in accordance with amount of heat generation in the room
- Generator Hut, Stores: 3 times

7) Finishing Schedule

In selecting building interior and exterior materials, materials and finishes shall be those suited for local climate conditions and have been well accepted locally in an effort to realize the buildings that are easy to maintain. In addition, local procurement of construction materials shall be maximized for cost reduction and simple local repair/maintenance. However, securing supply and quality shall be regarded as an absolute requirement for interior materials, such as sound insulation fittings and some of the order-made shall be procured from a third country or Japan.

(a) Exterior Finish

Cement tile shall be used among the materials generally used locally for roof materials at both buildings. Concern exists over the use of metal roofs because salt problem has been frequently reported at both project sites due to their proximity to the coast. While tiles are roof materials with relatively large mass, they have many merits including good weather resistance, good sound insulation effect for the broadcasting studio and being relatively

inexpensive and easy to maintain for the facility.

Synthetic resin spray painting shall be applied to exterior walls having their superior weather resistance. Exterior fittings for the buildings shall include aluminum sash for windows, steel doors from security point of view.

Both the wood used for the fascia boards on sloped roof and wood-wool cement board used on the eaves shall be coated with synthetic resin oil paint.

(b) Interior Finish

Local-procured wooden flooring material shall be used to finish the large and medium studios. Imported carpet tile shall be used in small studios and sub-control rooms. Walls and ceilings at these studios and their control rooms shall be finished with various sound-absorbing materials such as cloth and wood for final finish.

As for other general rooms, their floor shall be finished with vinyl sheets and their walls with mortar and emulsion paint finish, which is most standard conventional finishing method. System ceiling with rock wool ceiling boards shall be used for ceilings of these rooms and corridors because multiple type air conditioning equipment will be installed inside the ceiling. Skirting shall be made of wood that can easily be procured locally for the studio portion and painted with synthetic oil paint.

Doors inside the buildings shall be made of steel for the rooms where sound insulation fixtures and equipment are stored and for machinery rooms. Other doors shall be made of wood.



### 2-3-3 Basic Design Plan

#### (1) Equipment

Fig. 2-3-2 RTD Schematic Diagram Kunduchi Transmitting Station

Fig. 2-3-3 RTD Equipment Layout of Kunduchi Transmitting Building

Fig. 2-3-4 RTD Kunduchi Transmitting Station Antenna System

Fig. 2-3-5 RTD Schematic Diagram Of New Studio System

Fig. 2-3-6 RTD Schematic Diagram of Master Control Room, New Studio Block

Fig. 2-3-7 RTD Schematic Diagram of Studio , New Studio Block

Fig. 2-3-8 RTD Schematic Diagram of Studio , New Studio Block

Fig. 2-3-9 RTD Schematic Diagram of Studio • • , New Studio Block

Fig. 2-3-10 RTD Schematic Diagram of Ancillary Equipment (1)

Fig. 2-3-11 RTD Schematic Diagram of Ancillary Equipment (2)

Fig. 2-3-12 RTD Equipment Layout of Master Control Room & Transmission Room, New Studio Block

Fig. 2-3-13 RTD Equipment Layout of Studio , New Studio Block

Fig. 2-3-14 RTD Equipment Layout of Studio , New Studio Block

Fig. 2-3-15 RTD Equipment Layout of Studio • • , New Studio Block

Fig. 2-3-16 Programme Transmitting Tower Elevation

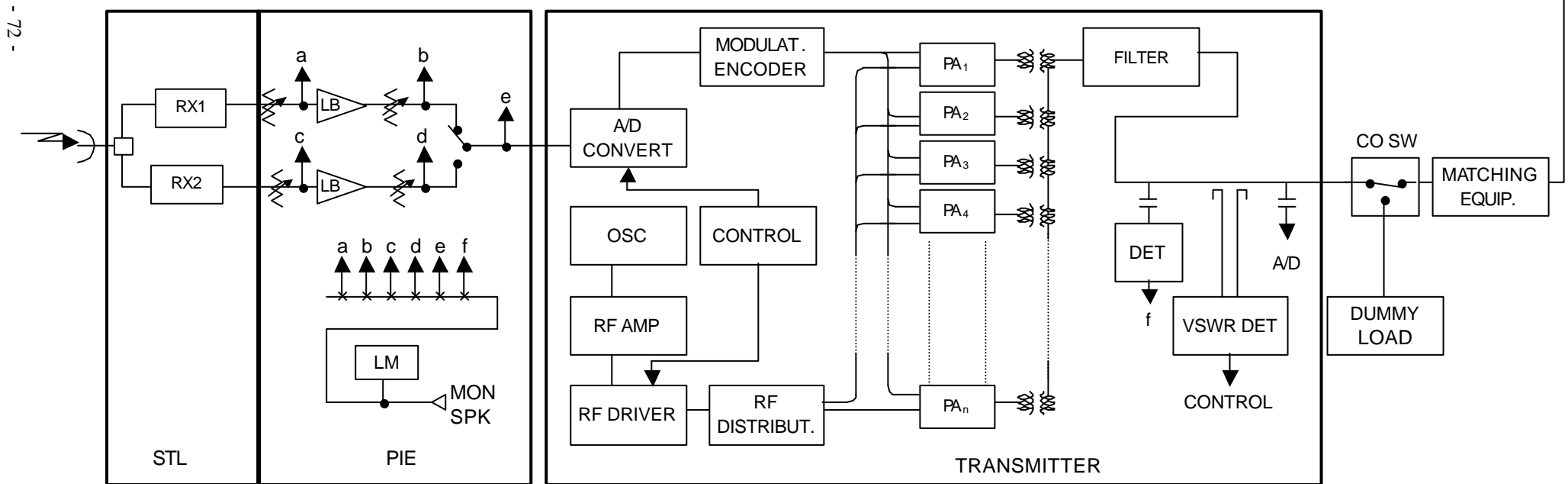
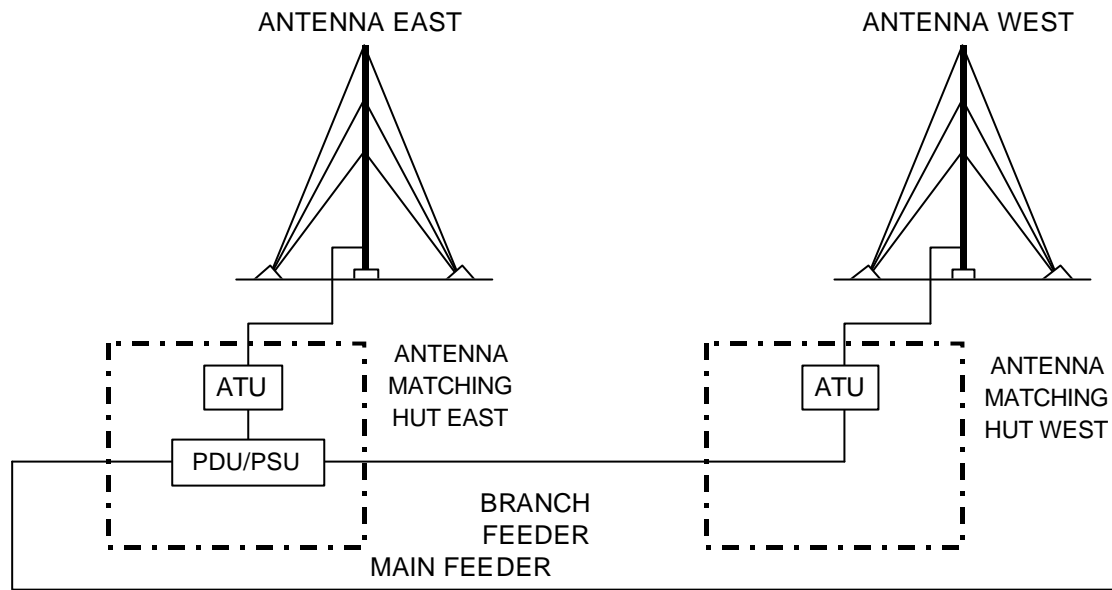


Fig. 2-3-2 RTD Schematic Diagram of Kunduchi Transmitting Station

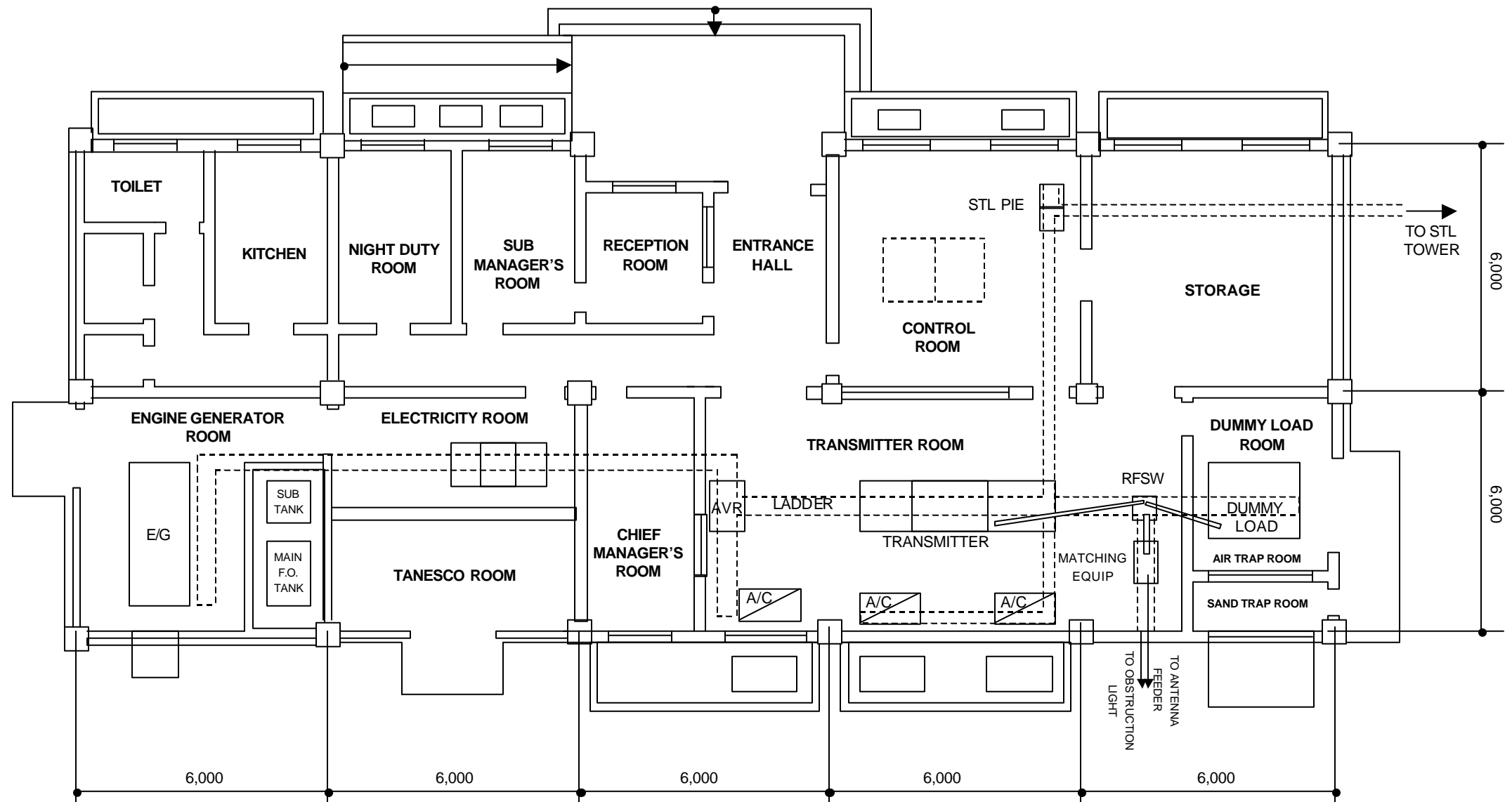


Fig. 2-3-3 RTD Equipment Layout of Kunduchi Transmitting Building

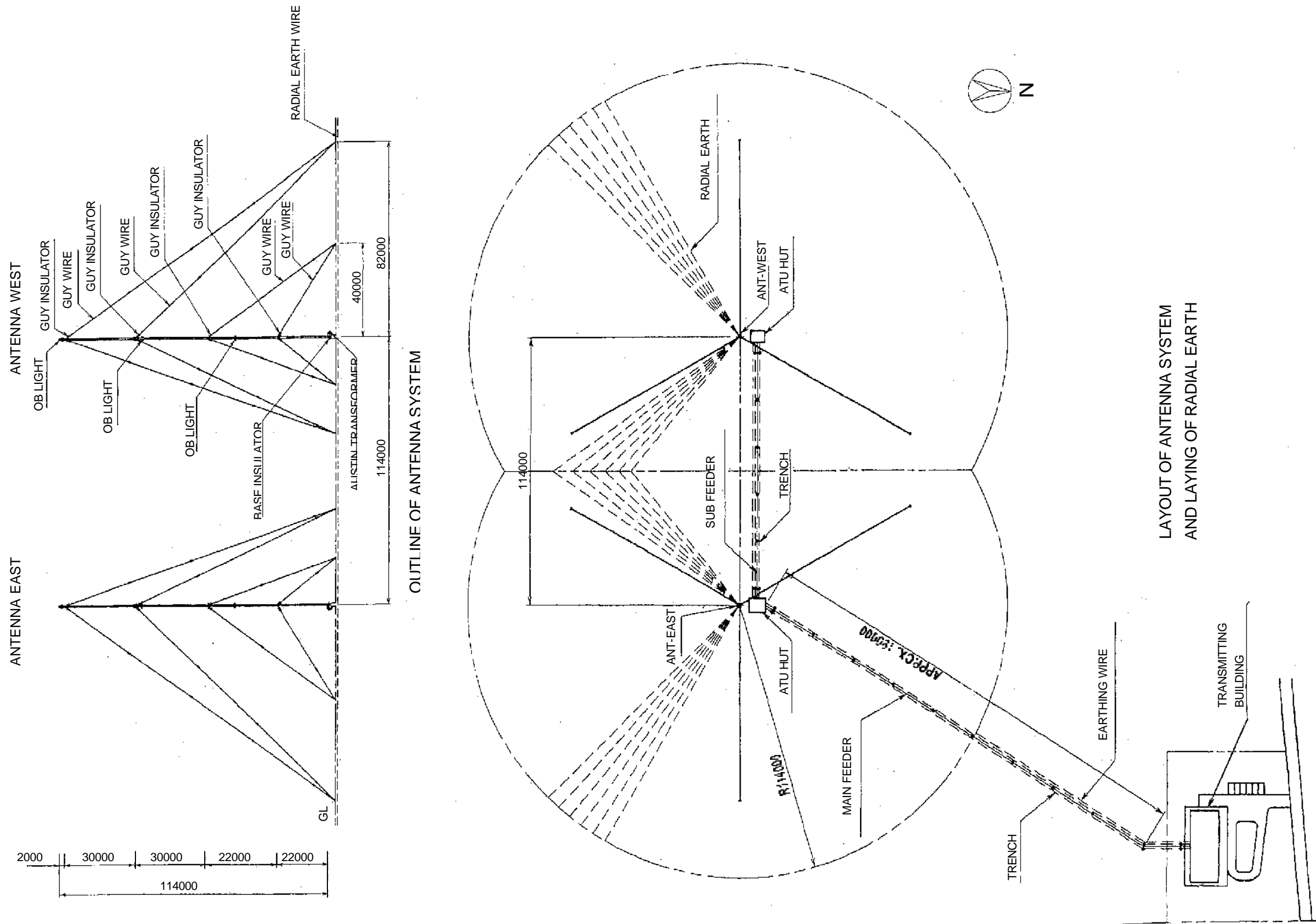


Fig.2-3-4 RTD Kunduchi Transmitting Station Antenna System

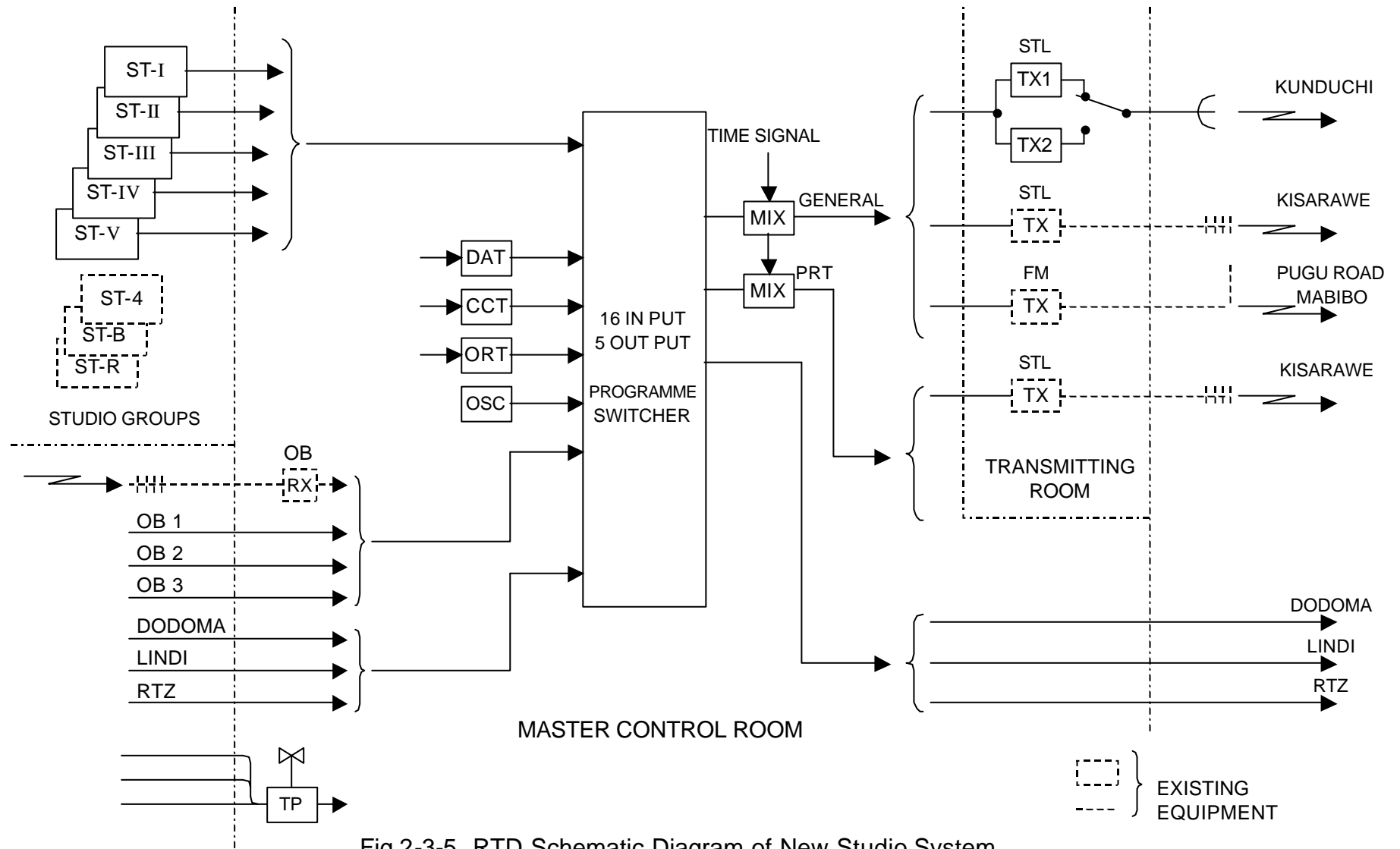


Fig.2-3-5 RTD Schematic Diagram of New Studio System

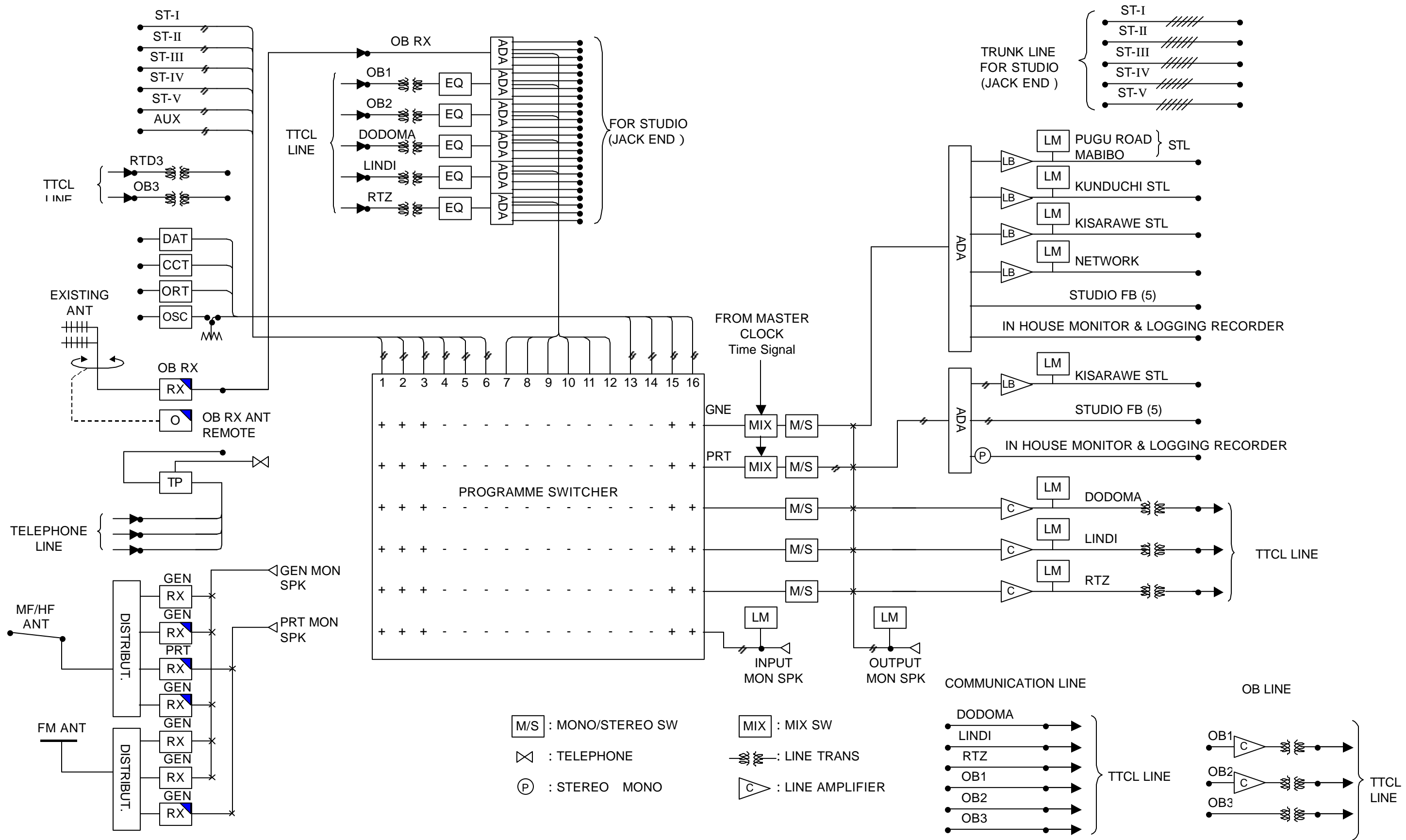


Fig.2-3-6 RTD Schematic Diagram of Master Control Room, New Studio Block

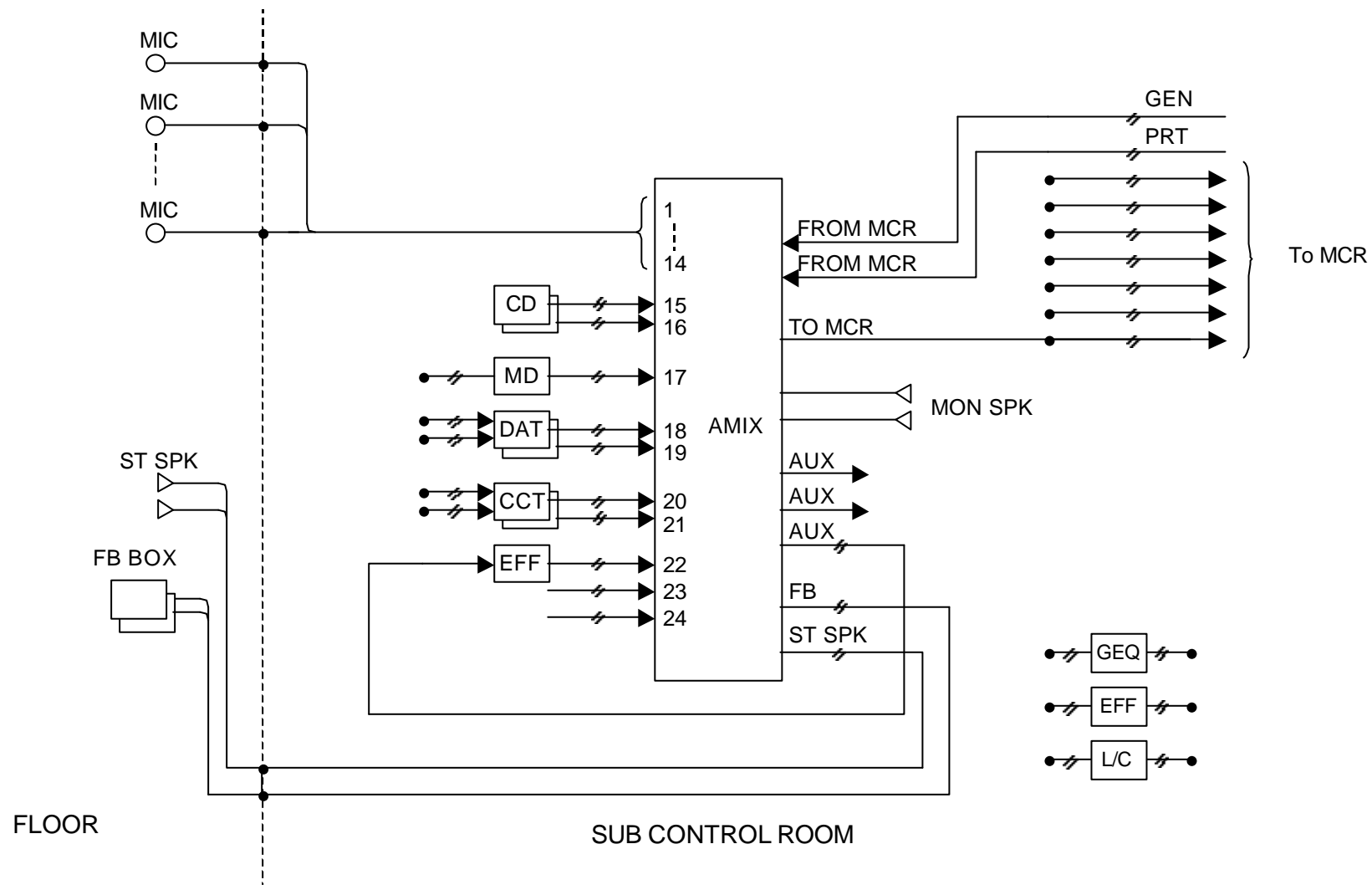


Fig.2-3-7 RTD Schematic Diagram of Studio , New Studio Block

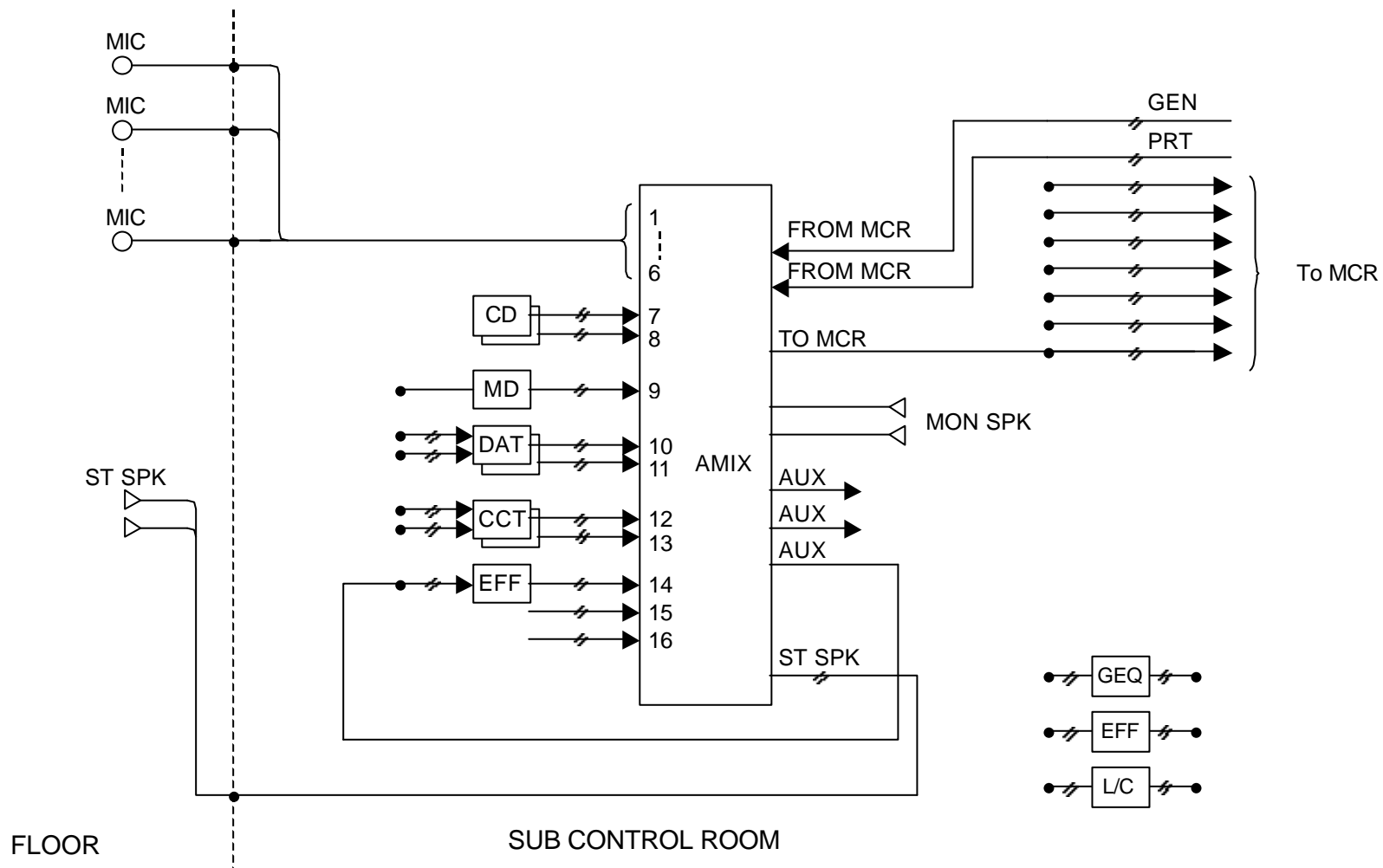


Fig.2-3-8 RTD Schematic Diagram of Studio , New Studio Block



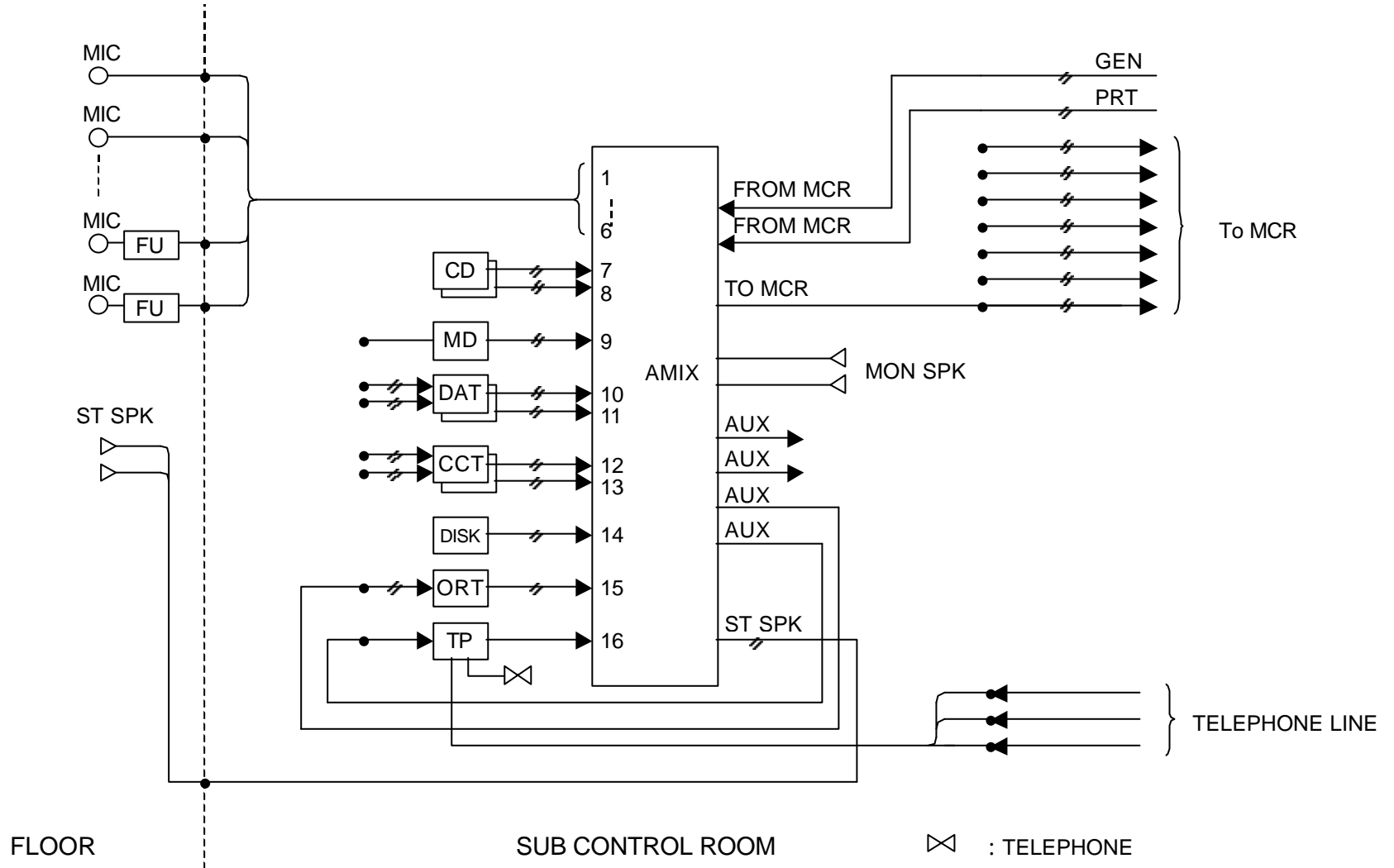


Fig.2-3-9 RTD Schematic Diagram of Studio . . . , New Studio Block

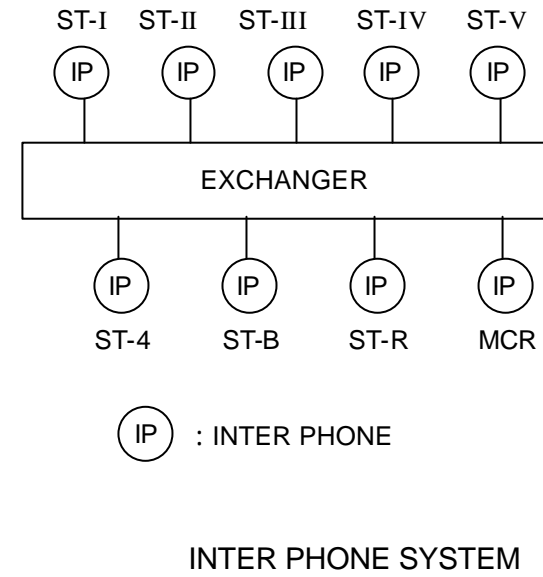
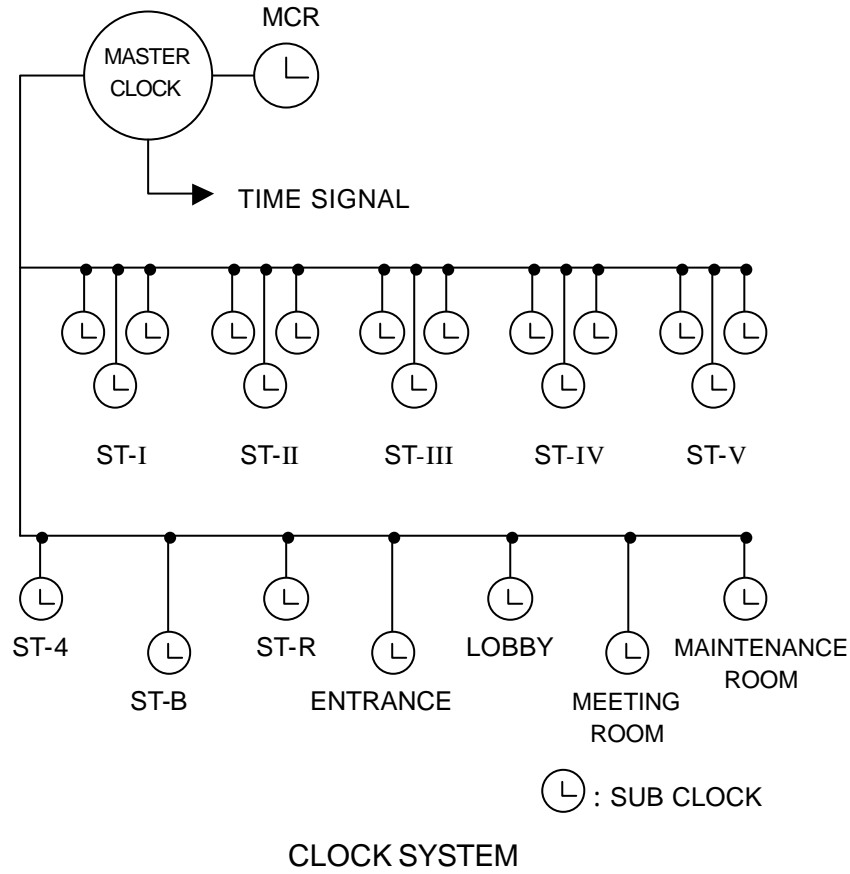


Fig.2-3-10 RTD Schematic Diagram of Ancillary Equipment (1)

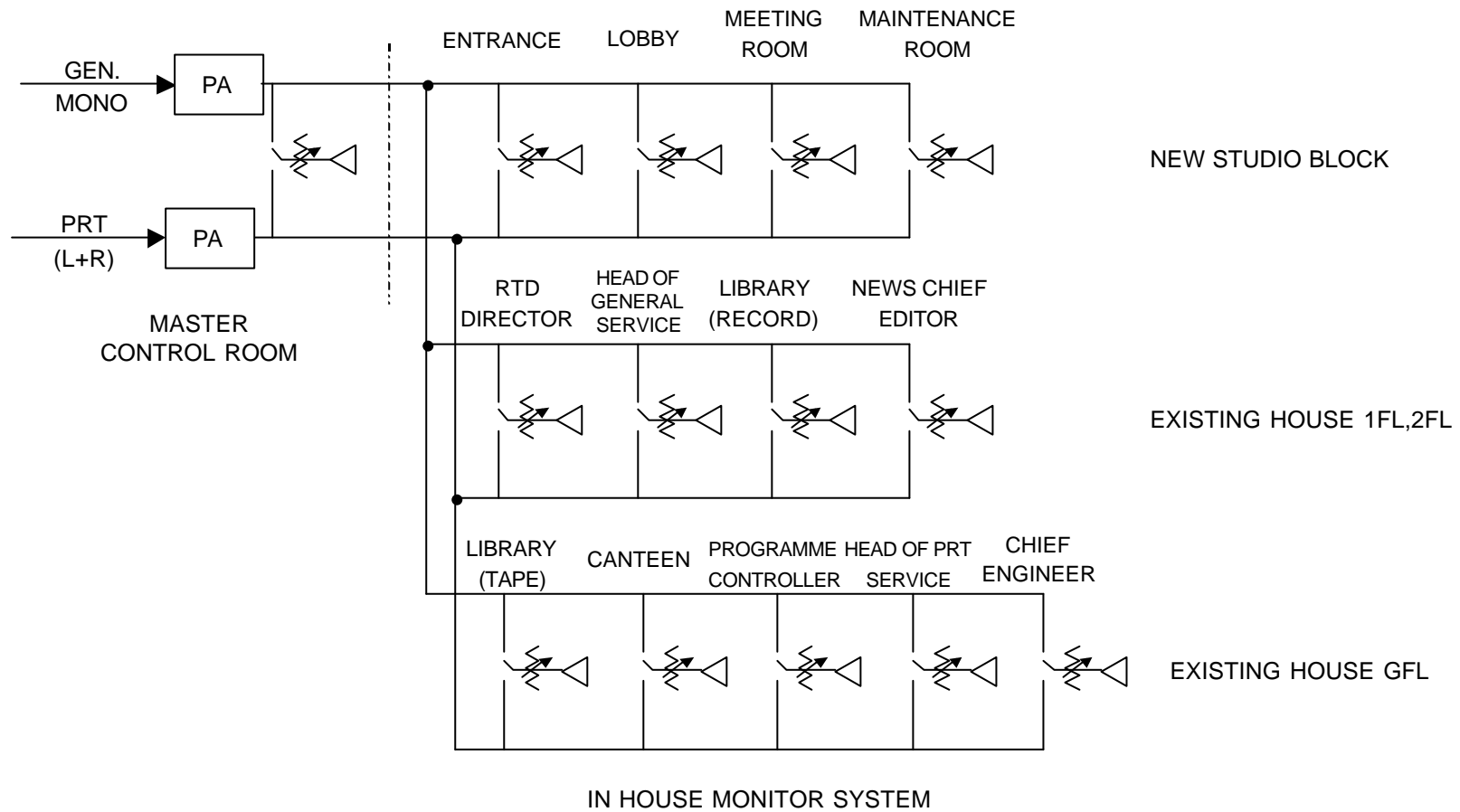


Fig.2-3-11 RTD Schematic Diagram of Ancillary Equipment (2)

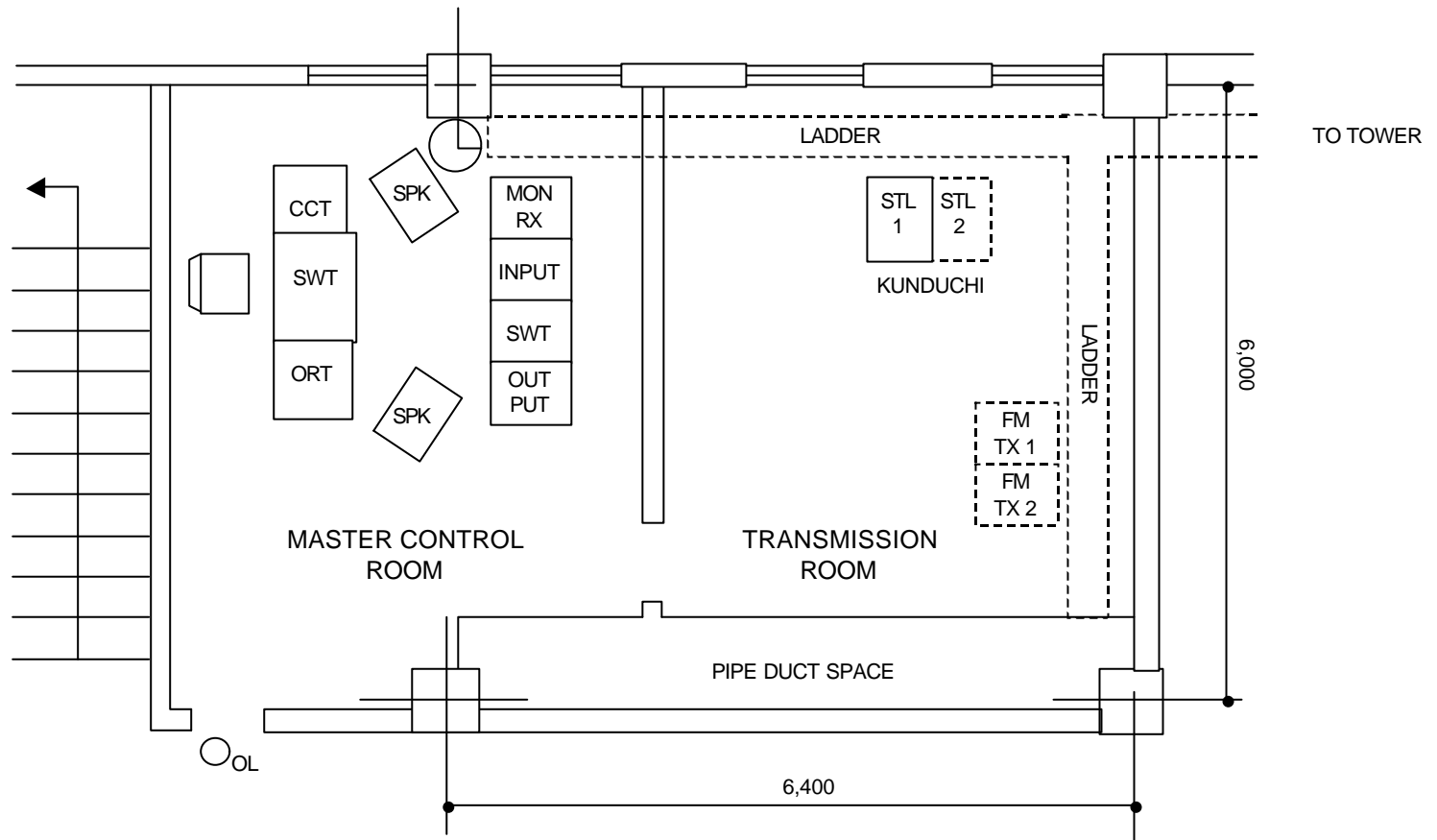


Fig.2-3-12 RTD Equipment Layout of Master Control Room & Transmission Room, New Studio Block

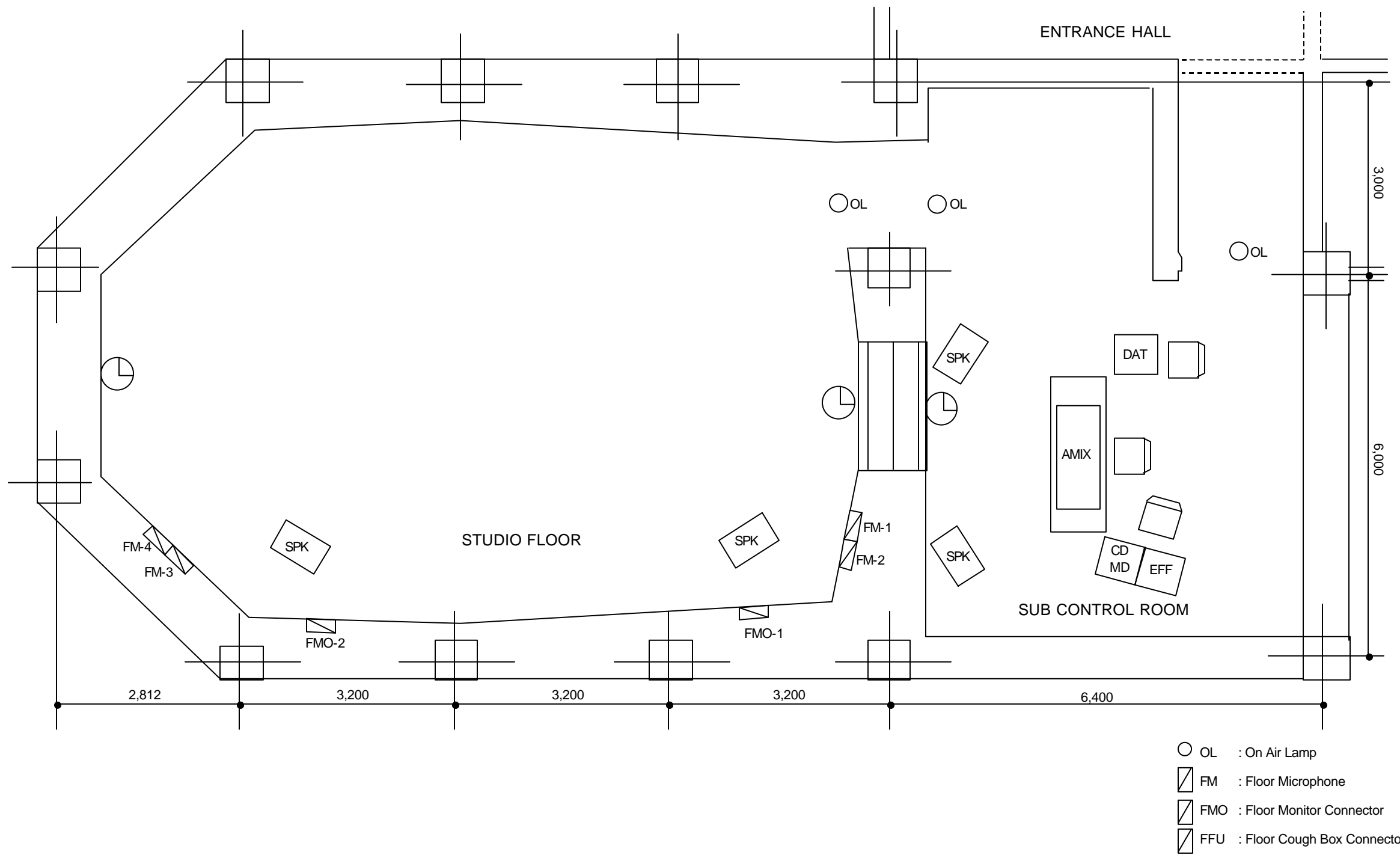


Fig.2-3-13 RTD Equipment Layout of Studio , New Studio Block

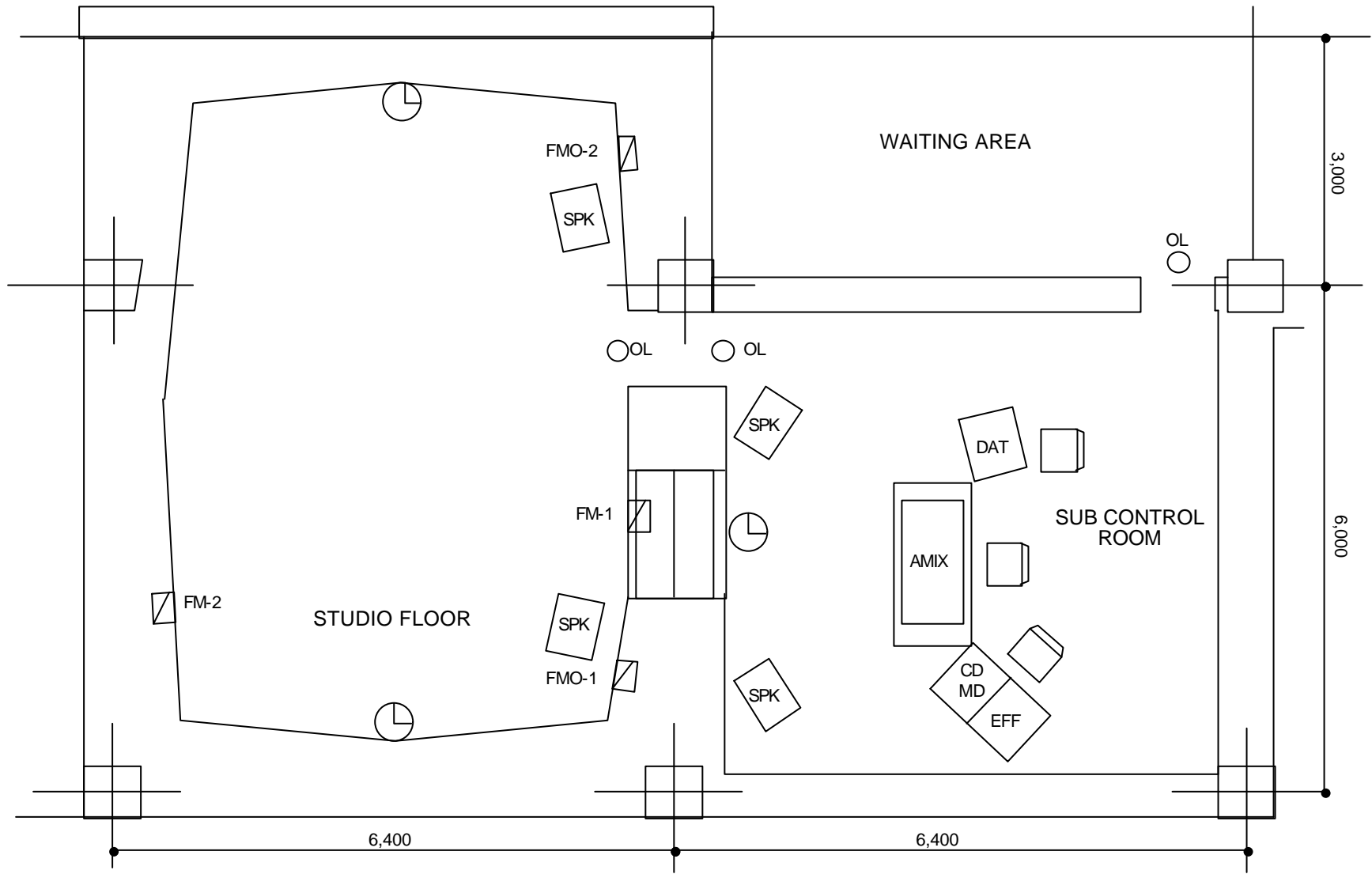


Fig.2-3-14 RTD Equipment Layout of Studio , New Studio Block

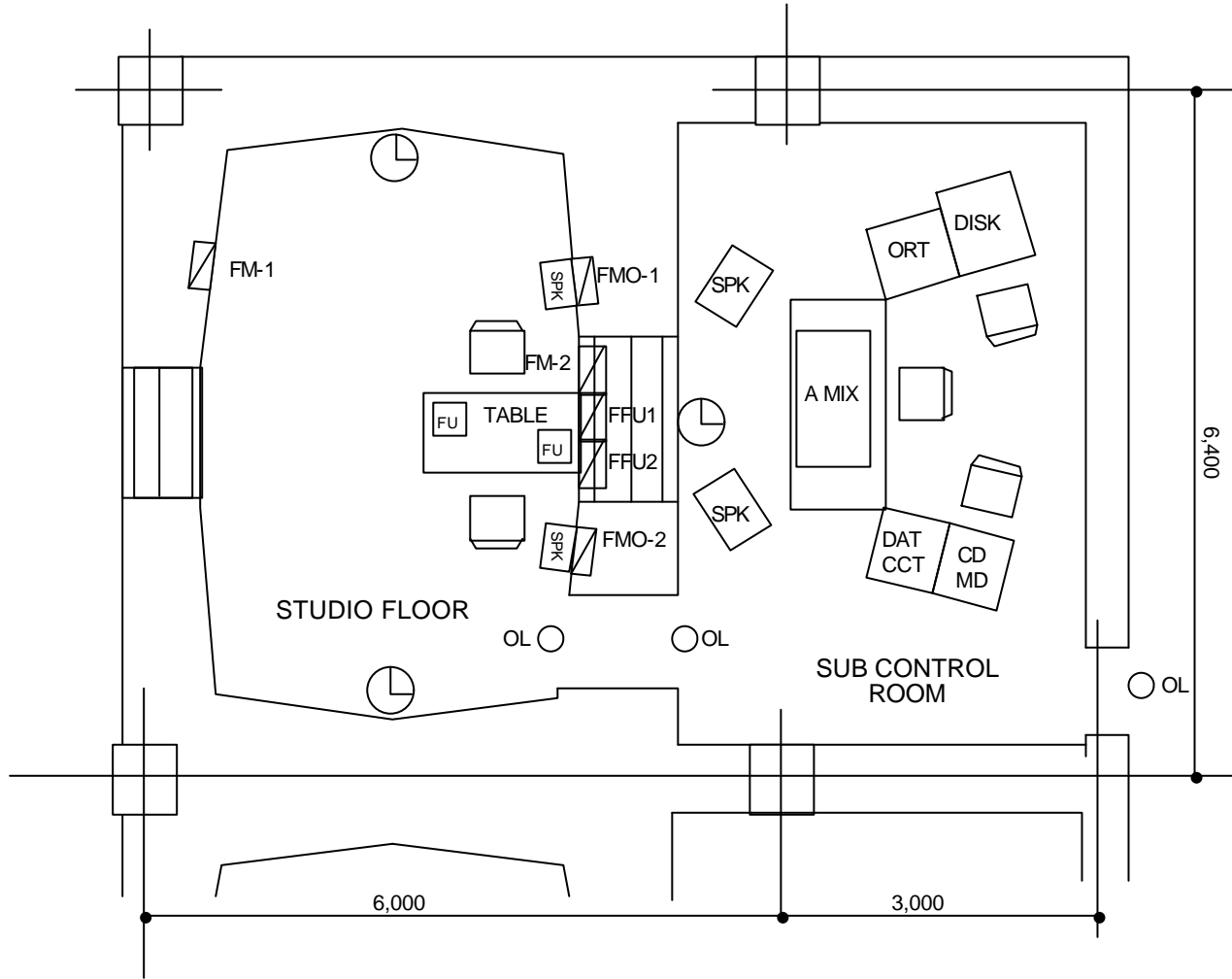
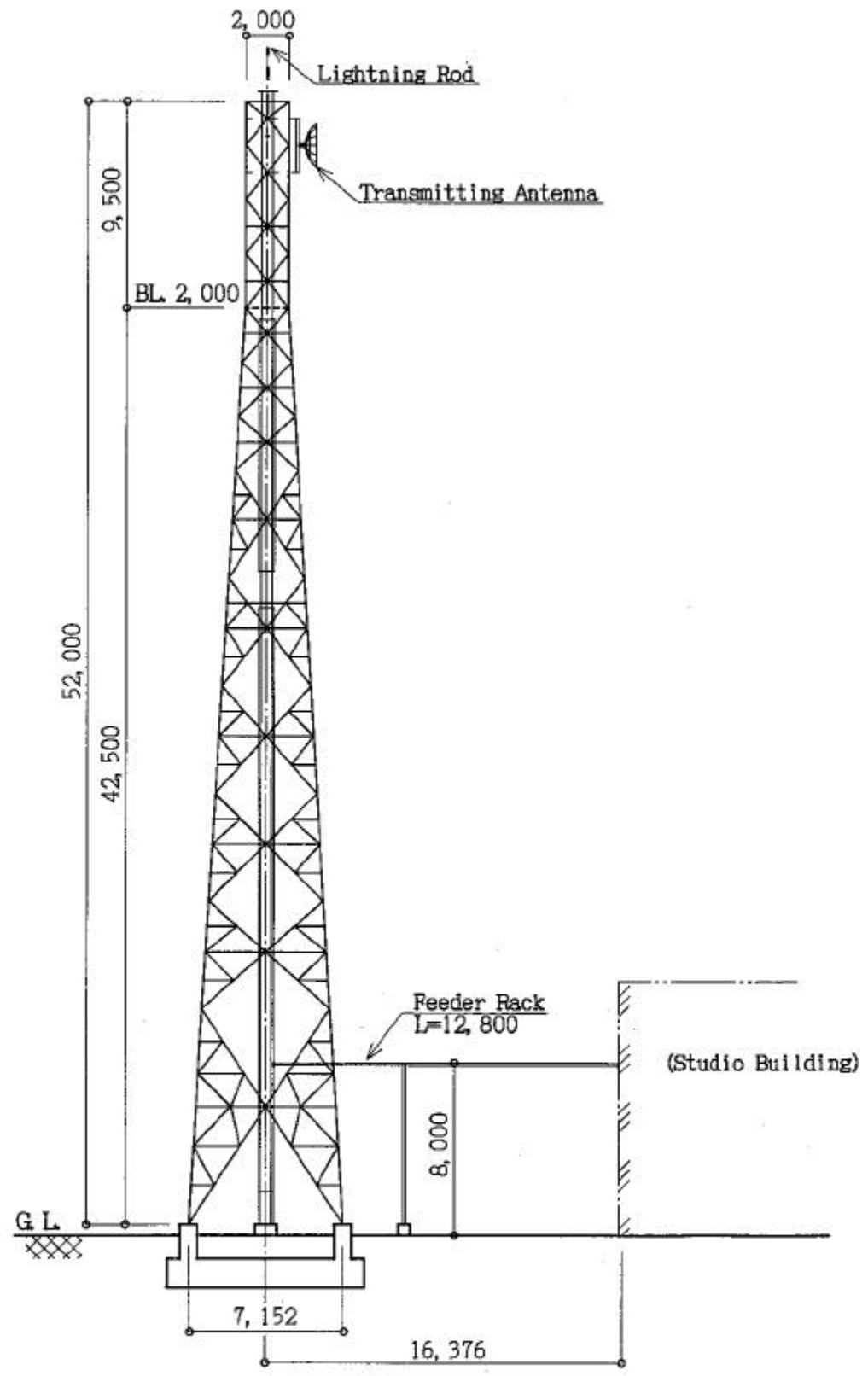
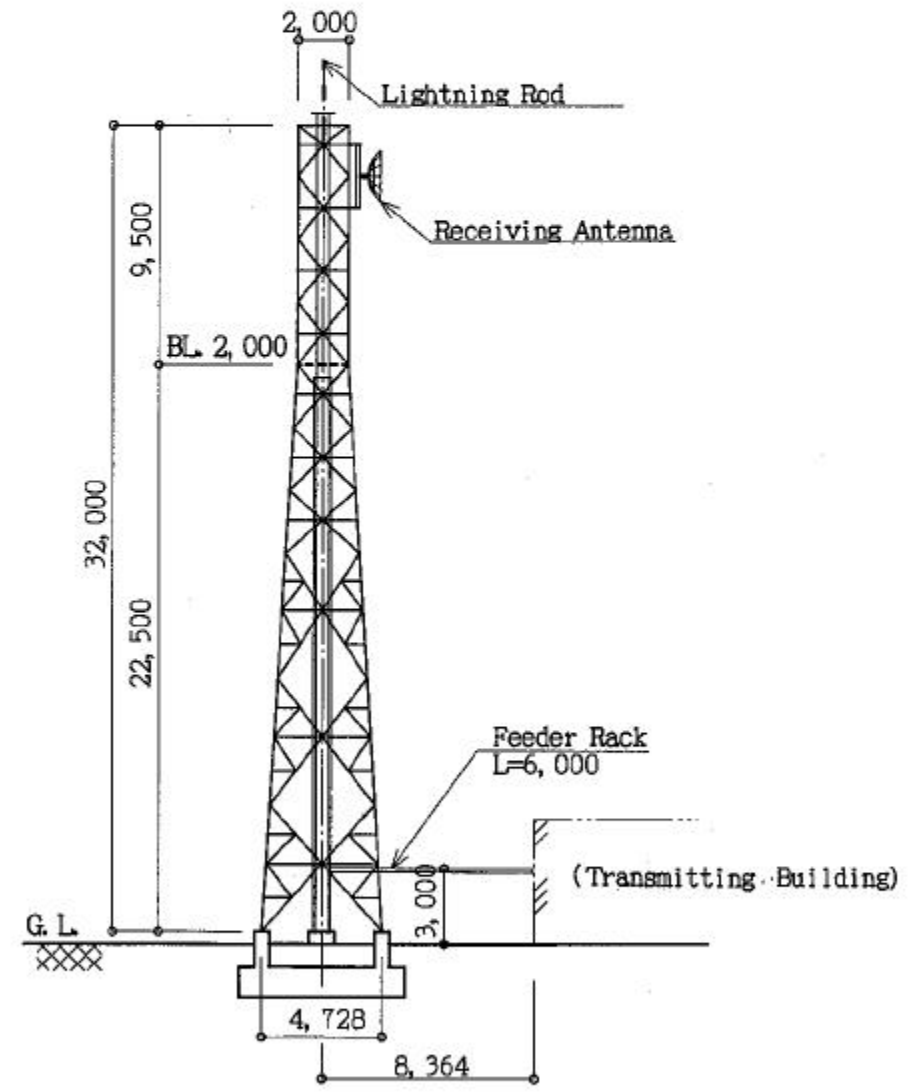


Fig.2-3-15 RTD Equipment Layout of Studio . . . , New Studio Block



RTD New Studio Site



Kunduchi Transmitting Site

Fig 2-3-16 Programme Transmitting Tower Elevation



(2) Facilities

Fig. 2-3-17 Kunduchi Transmitting Station / Site Layout Plan	S=1/3,000
Fig. 2-3-18 Kunduchi Transmitting Station Building / Site Layout Plan	S=1/300
Fig. 2-3-19 Kunduchi Transmitting Station Building / Plan • Elevation • Section	S=1/200
Fig. 2-3-20 RTD New Studio Block / Site Layout Plan	S=1/1,500
Fig. 2-3-21 RTD New Studio Block / Ground Floor Plan	S=1/200
Fig. 2-3-22 RTD New Studio Block / First Floor Plan	S=1/200
Fig. 2-3-23 RTD New Studio Block / Elevation (1)	S=1/200
Fig. 2-3-24 RTD New Studio Block / Elevation (2) • Section	S=1/200

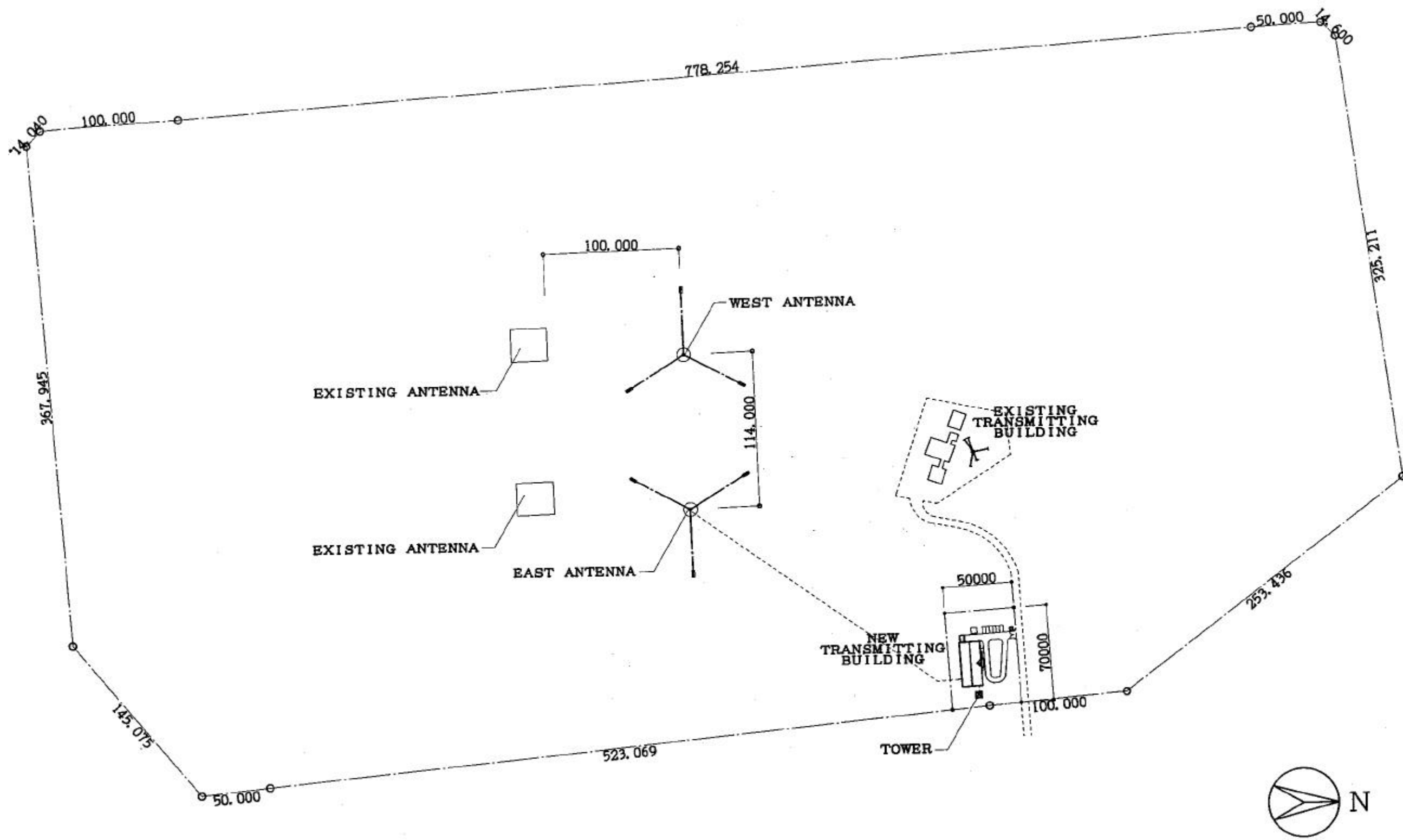


Fig. 2-3-17 Kunduchi Transmitting Station / Site Layout Plan S=1/3,000

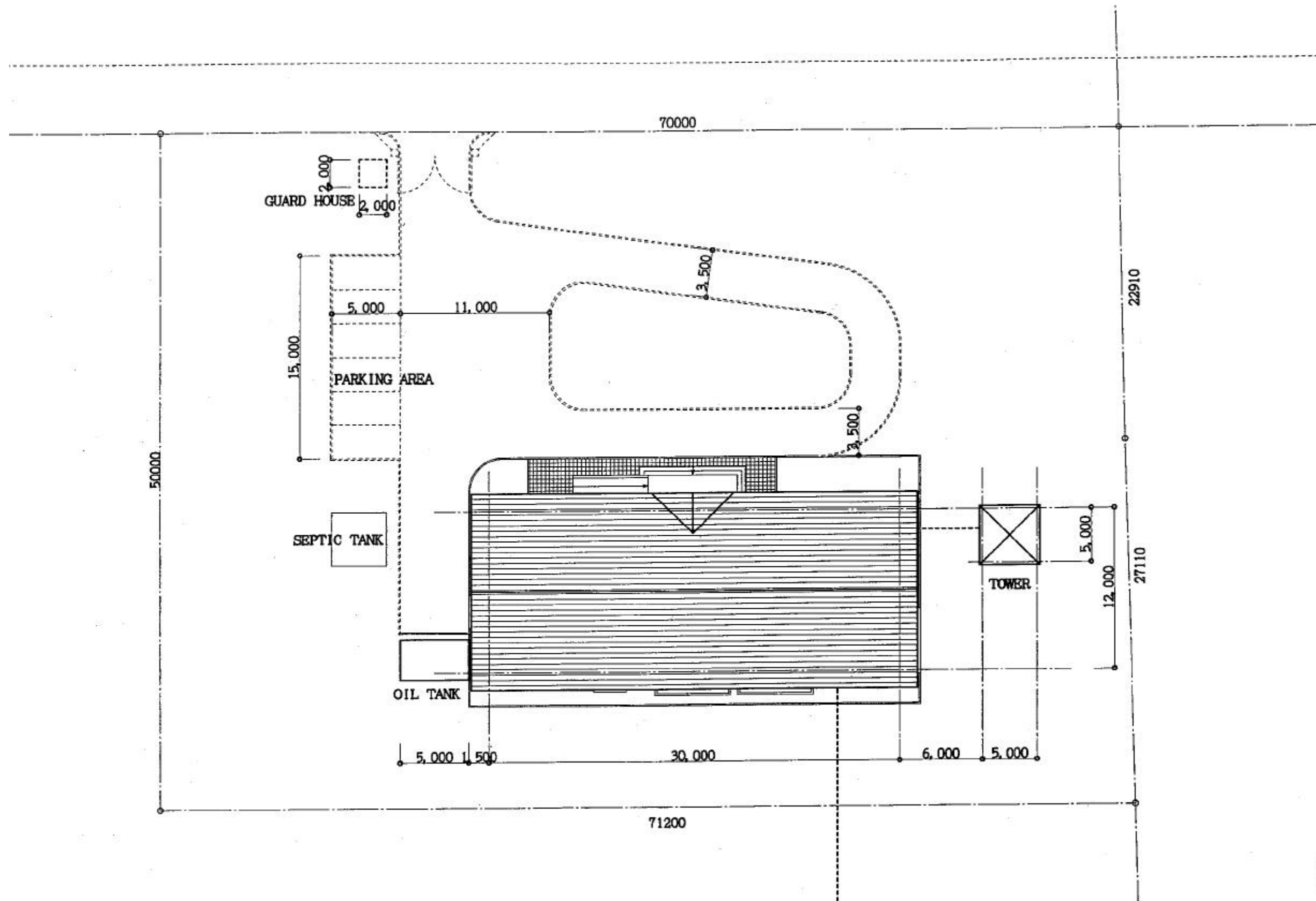
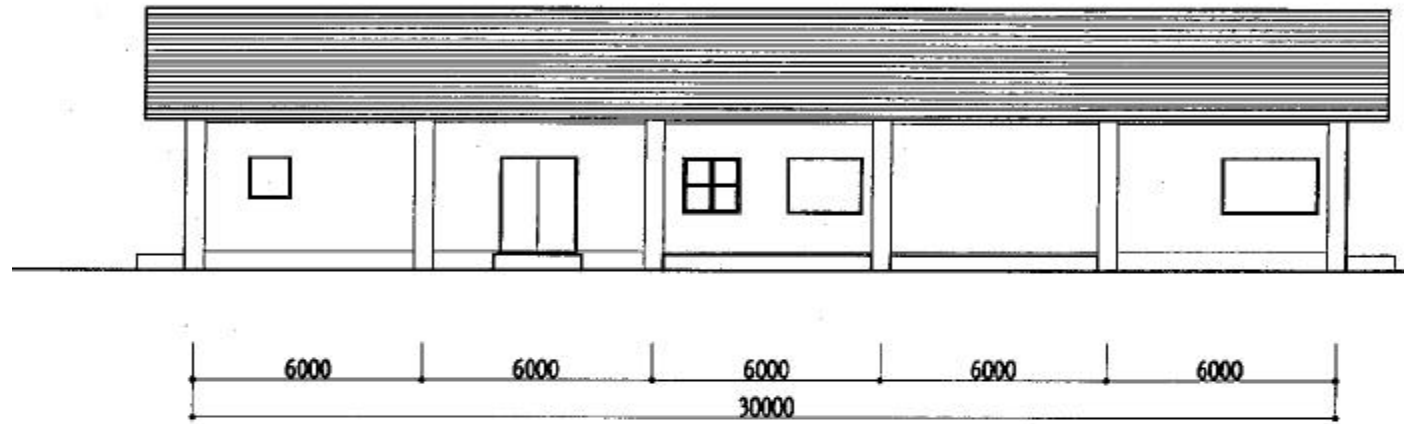


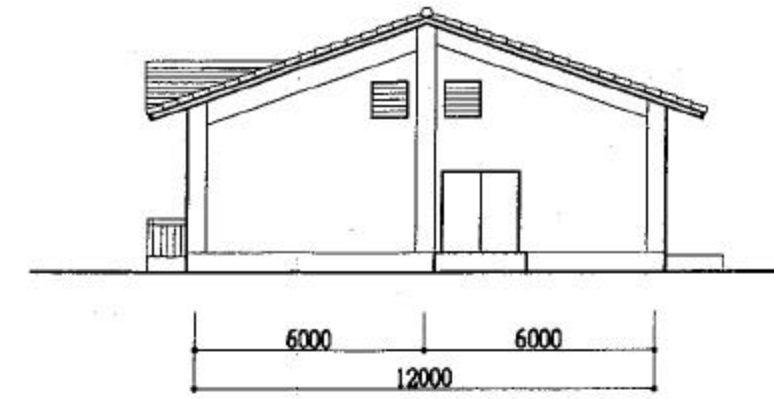
Fig. 2-3-18 Kunduchi Transmitting Station Building / Site Layout Plan S=1/300



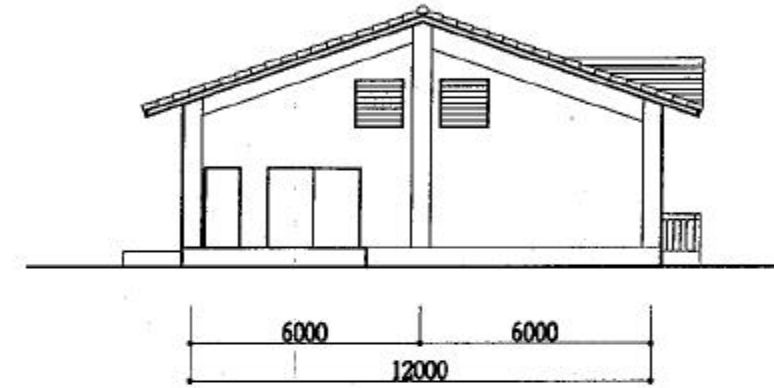
NORTH ELEVATION



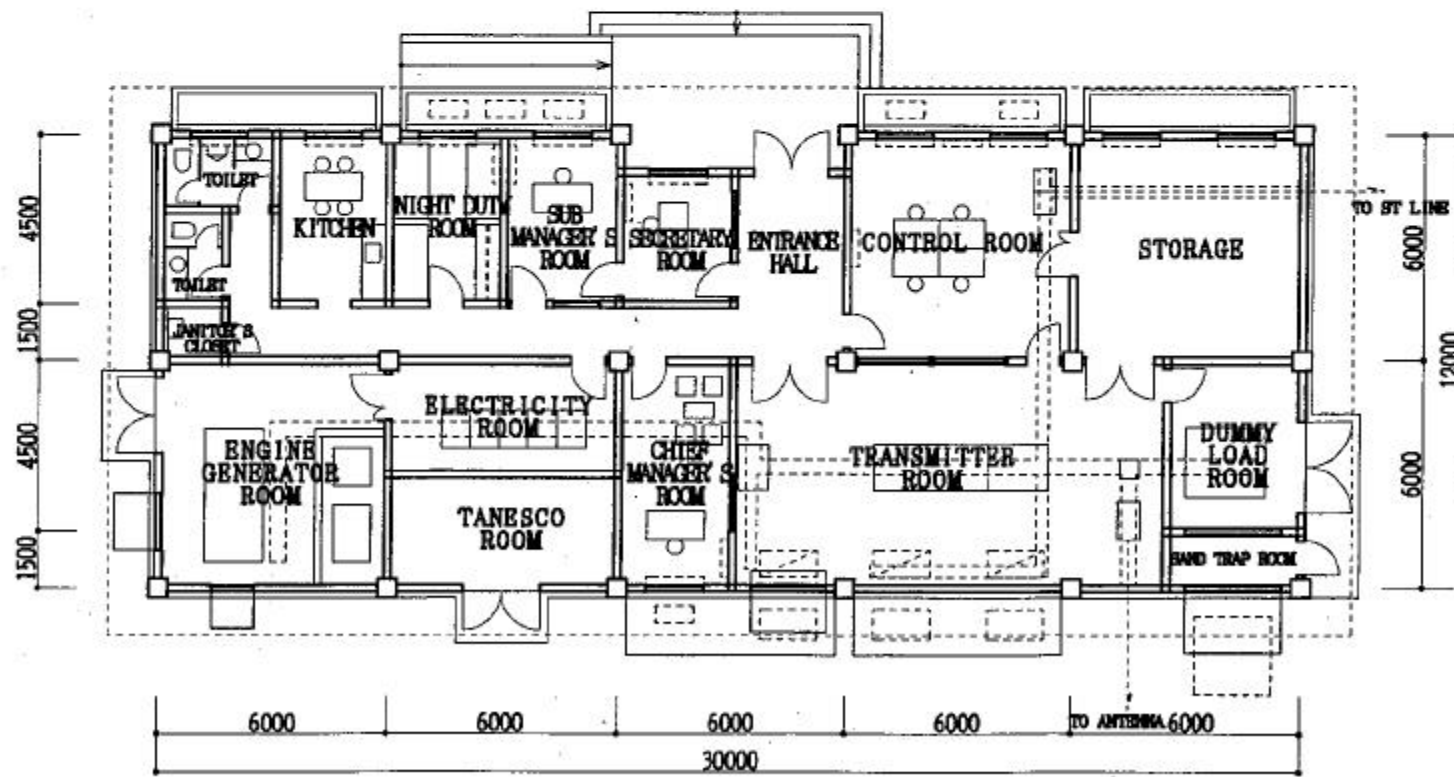
SOUTH ELEVATION



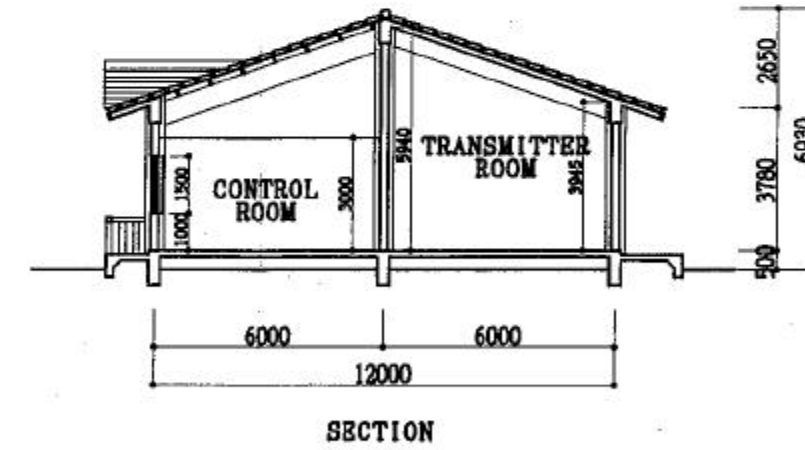
WEST ELEVATION



EAST ELEVATION



FLOOR PLAN



SECTION

Fig. 2-3-19 Kunduchi Transmitting Station Building / Plan · Elevation · Section S=1/200

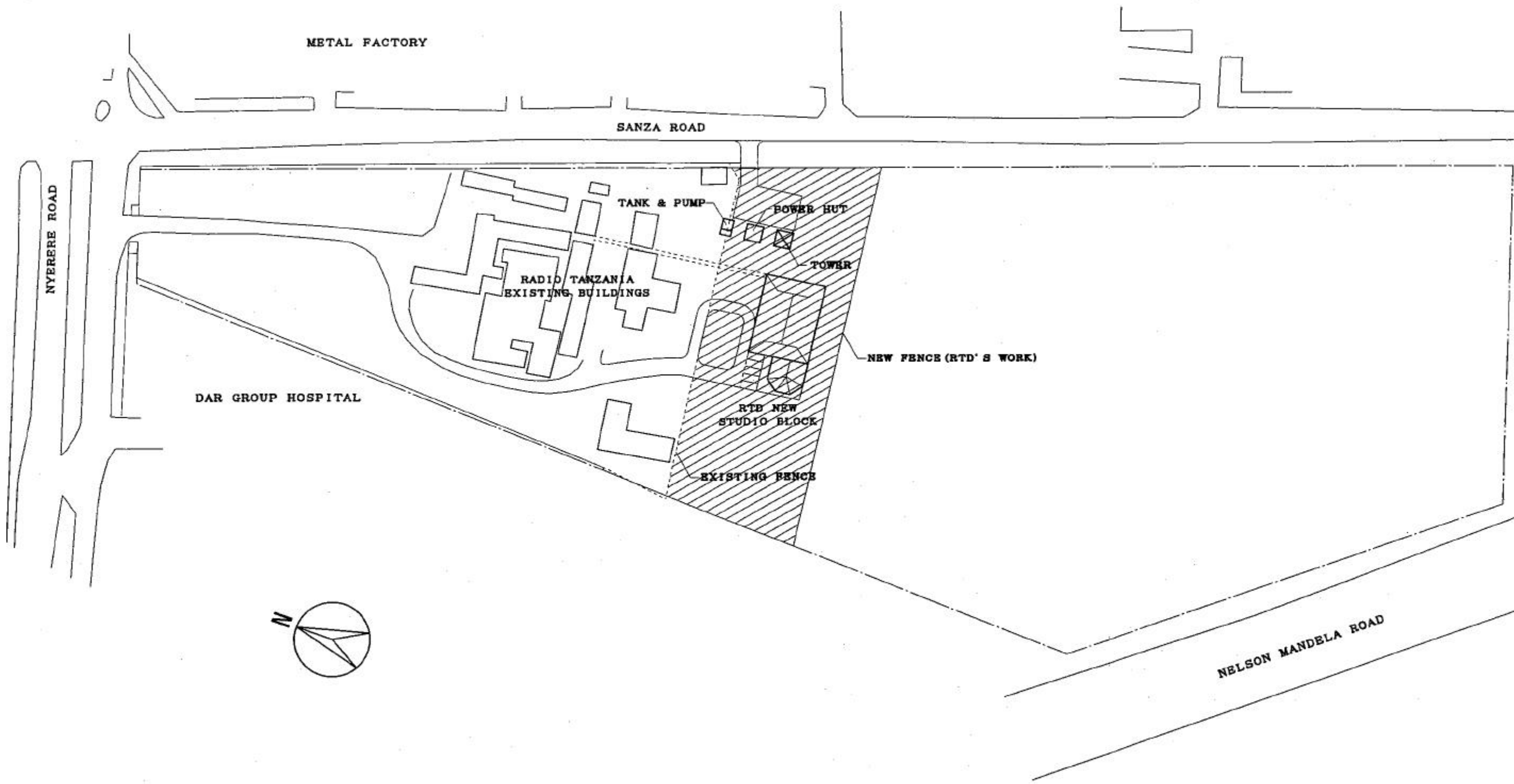
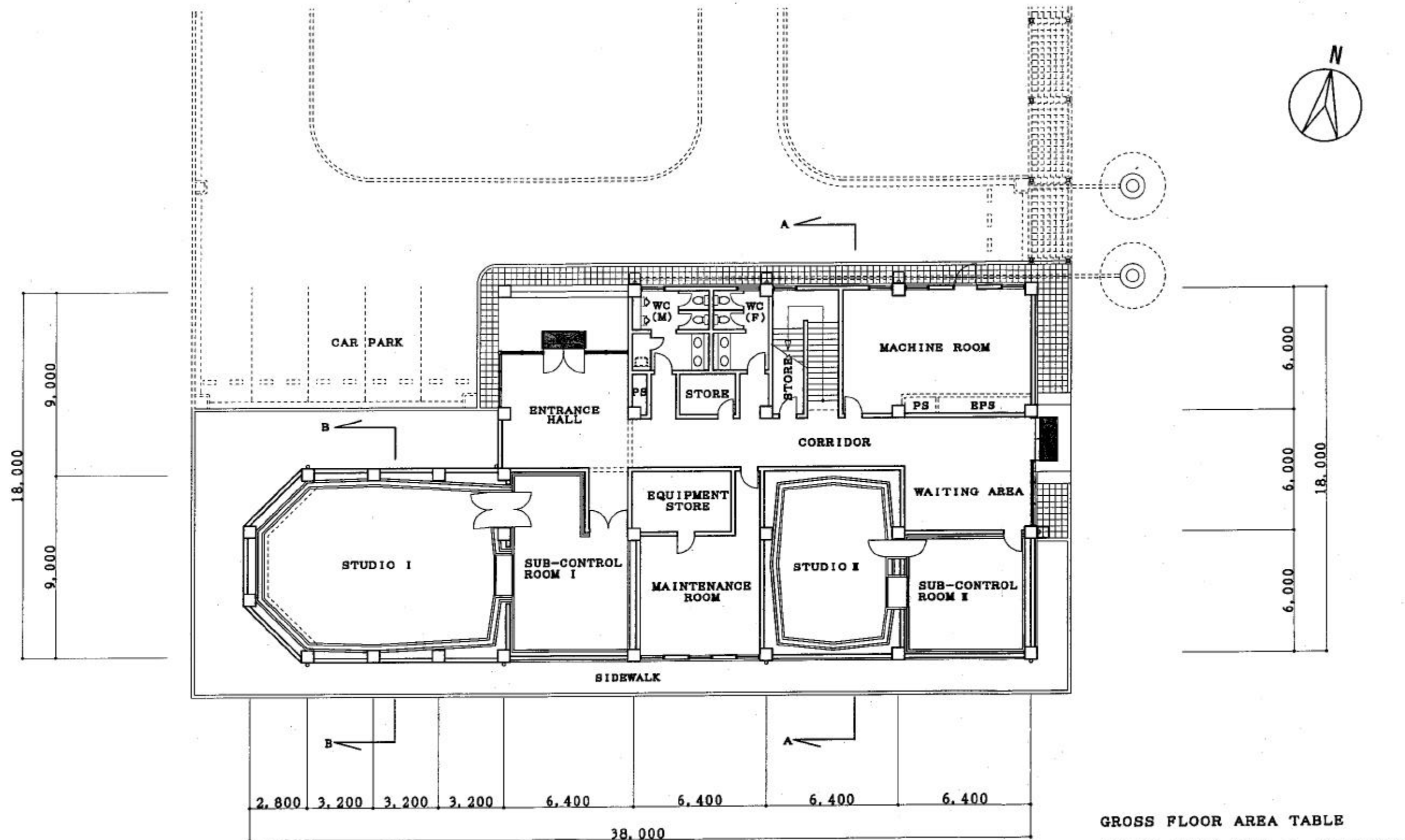


Fig. 2-3-20 RTD New Studio Block / Site Layout Plan S=1/1,500



**GROSS FLOOR AREA TABLE**

GROUND FLOOR AREA : 560.67sqm

FIRST FLOOR AREA : 447.82sqm

TOTAL FLOOR AREA : 1,008.49sqm

Fig. 2-3-21 RTD New Studio Block / Ground Floor Plan S=1/200

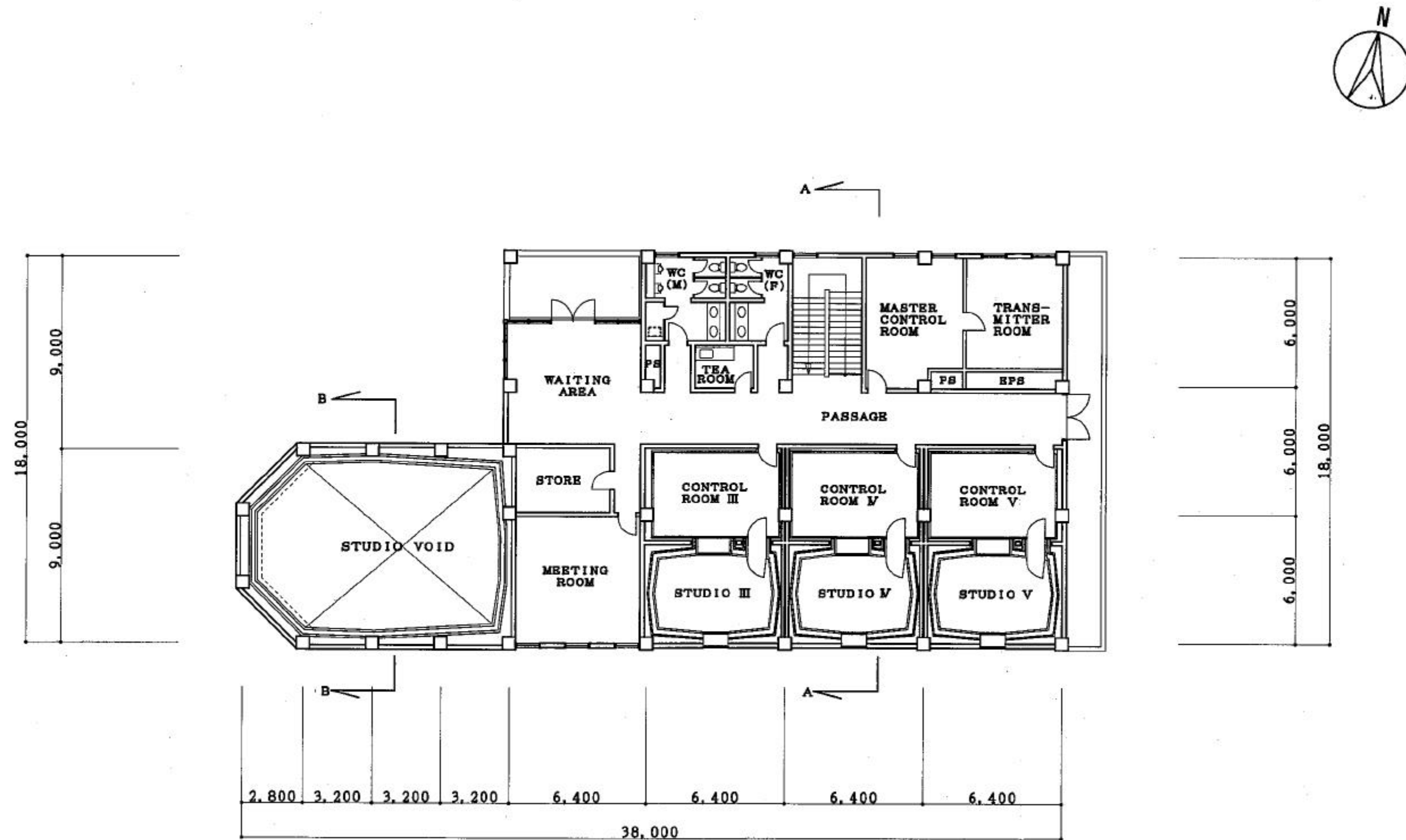
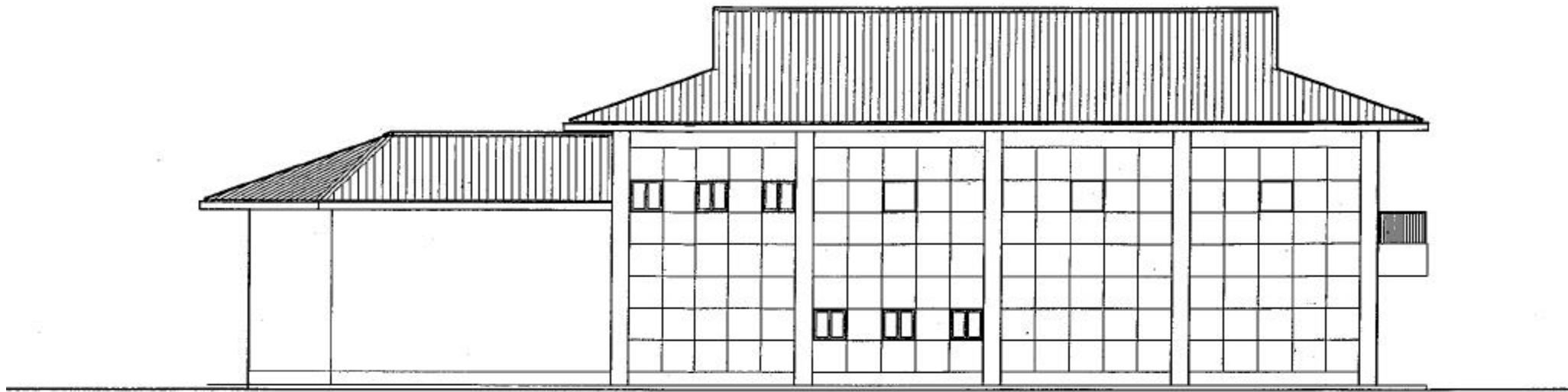
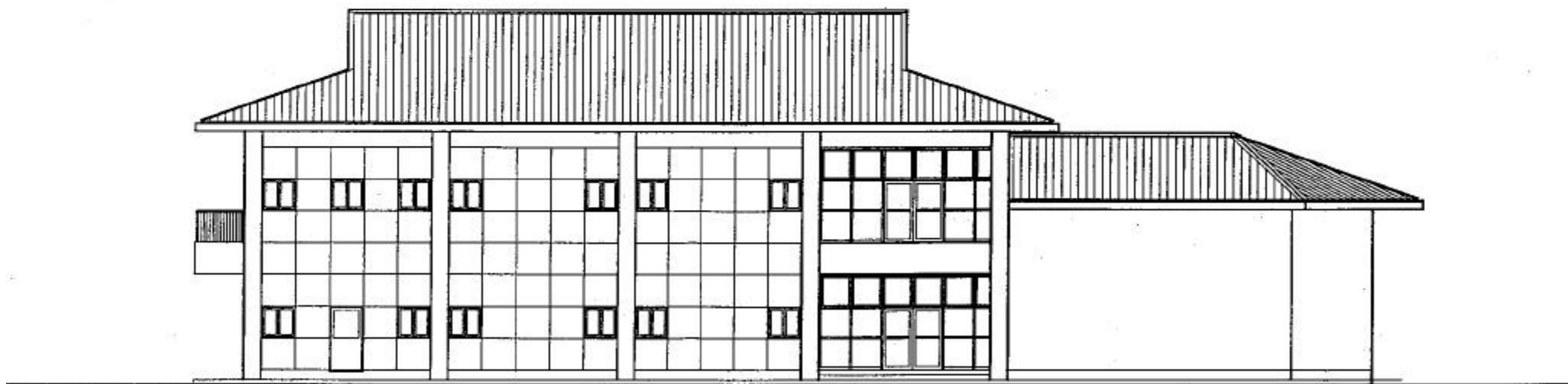


Fig. 2-3-22 RTD New Studio Block / First Floor Plan S=1/200



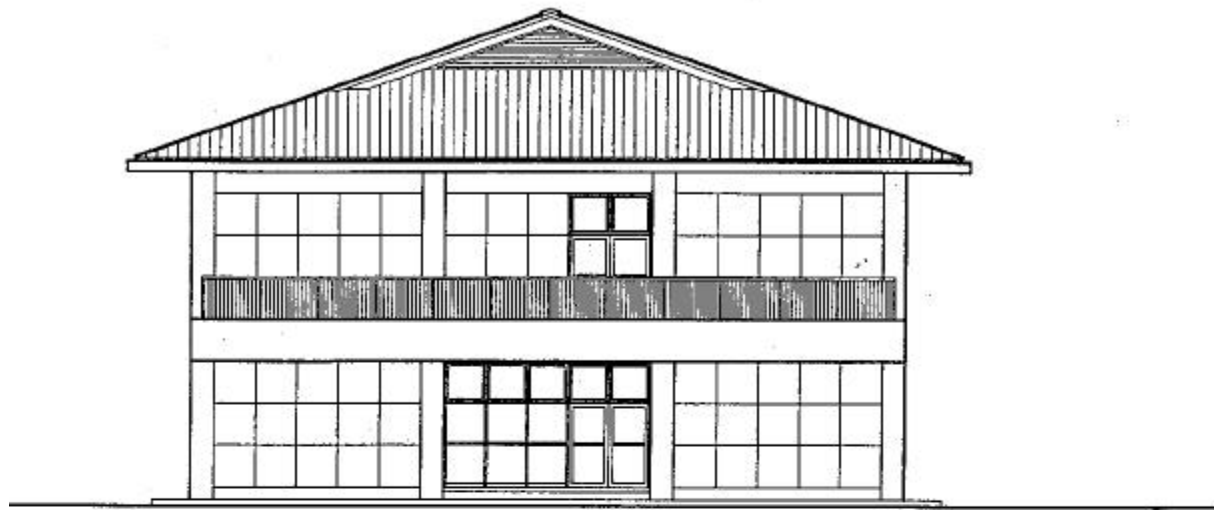
SOUTH ELEVATION



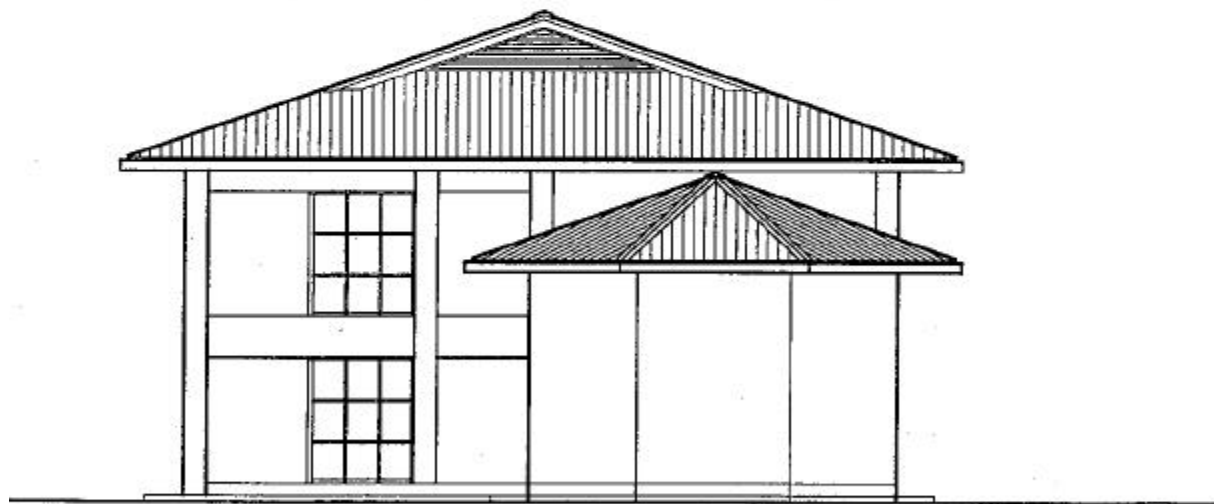
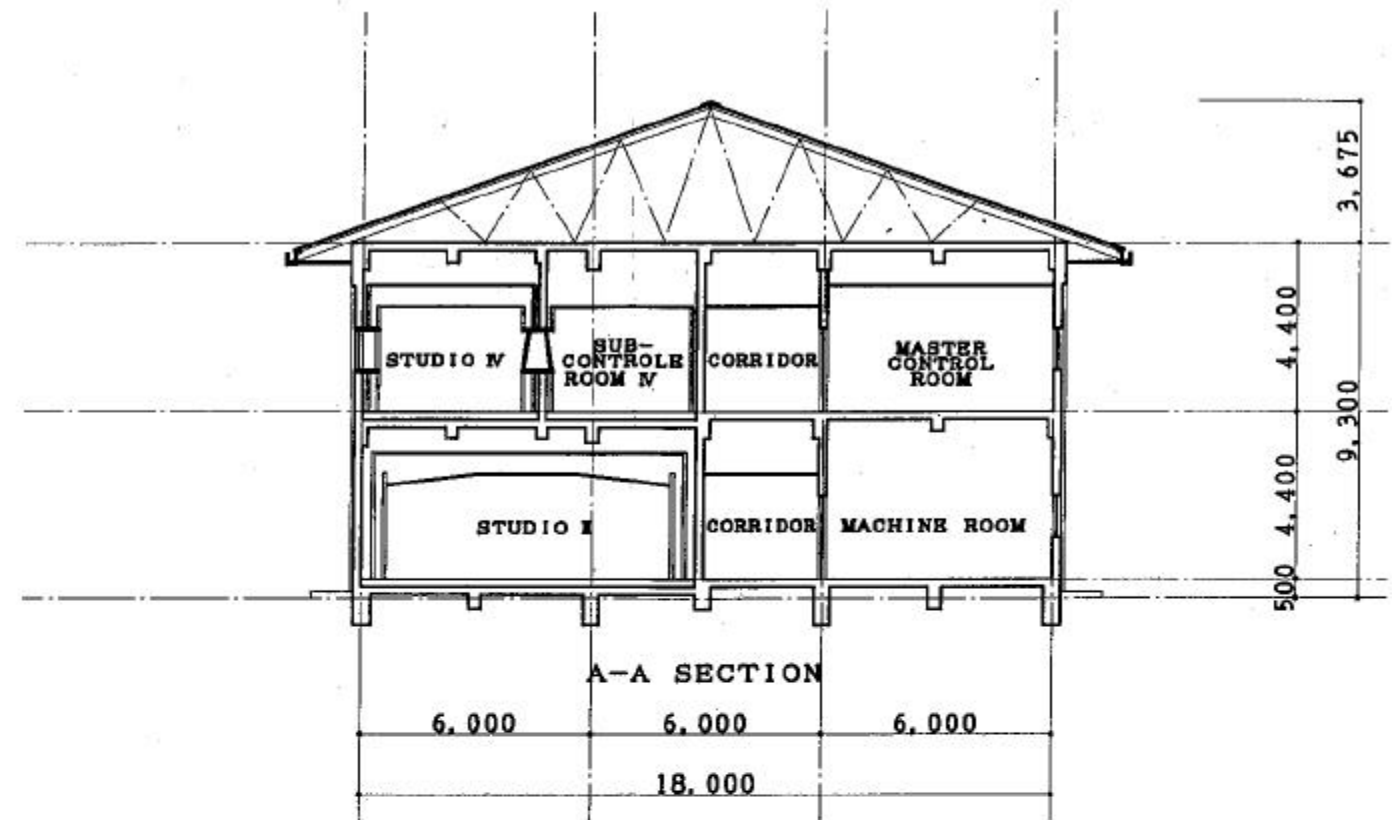
NORTH ELEVATION

Fig. 2-3-23 RTD New Studio Block / Elevation (1) S=1/200





EAST ELEVATION



WEST ELEVATION

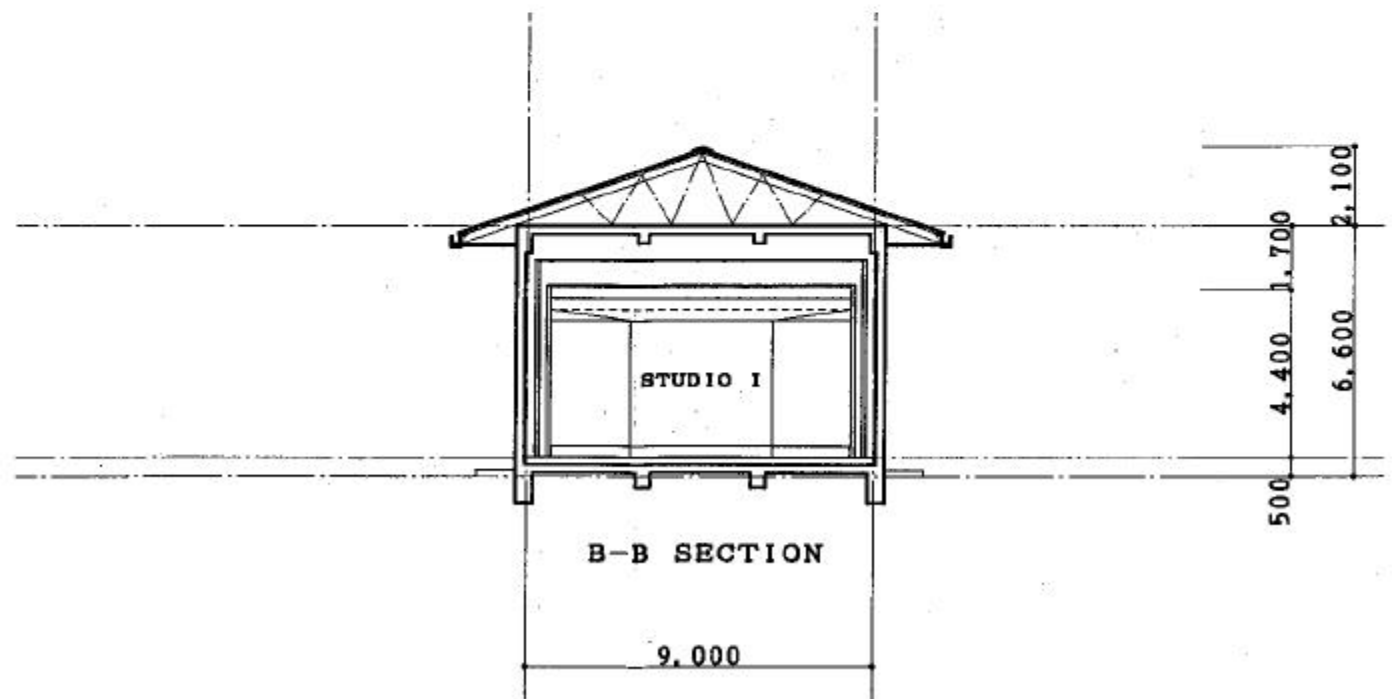


Fig. 2-3-24 RTD New Studio Block / Elevation (2) • Section S=1/200

## **Chapter 3**

### **Implementation Plan**

## **Chapter 3 Implementation Plan**

### **3-1 Implementation Plan**

#### **3-1-1 Implementation Concept**

##### **(1) Management Set-Up of RTD**

To ensure smooth execution of the Project, RTD shall organize a project execution team as early as possible. The nature of the Project requires RTD to assign two executive officers in charge of the building and the equipment and to secure a management system that would enable the members to respond promptly under the order of respective officers. The most important operations to be carried out by the team can be summarized as follows.

Ensure the site and specifying of the boundary of the site.

- Securing of the Project Site and the confirmation of the Boundary of the site.
- Securing the budget for the work to be carried out by Tanzania and the management of the timely work in accordance to the implementation schedule
- Sorting and grasping of authorized regulations by the Tanzanian Government related to permission of building construction and installation of broadcasting equipment. And, provision of information and support for the consultant to obtain the permission.
- Review of required procedures to be performed by the client during the construction period and preparations of countermeasure

The aforementioned important items shall complete all the study at least during the period in which the consultant is carrying out the detailed design. In particular, permission related to building design may cause serious delay completion of the implementation schedule if dealt in a wrong manner. The team shall study the project thoroughly by the time of initial stage of detailed design so as to provide the information to the consultant timely and promptly.

##### **(2) Matters to be Considered in Work Management**

###### **1) Consideration for Complex Work**

Many of the design conditions of a radio studio centre, by no means an ordinary type of building, are determined by broadcasting equipment installed in the building.

Environmental conditions, installation method and arrangement of each equipment tend to differ depending on the specifications of the manufacturer of the equipment selected. Therefore, many adjustments will have to be made with regard to equipment foundations, piping for broadcasting equipment, shapes, quantities and positions of floor or wall openings that need to be prepared on the construction side. In the Project, it is vitally important that the consultant hold close coordination among all the parties concerned including the construction contractor and equipment contractor with detailed discussions for demarcation of their responsibilities.

2) Securing of Studio Quality

Construction of a studio building requires maintenance of excellent sound insulation performance as a radio studio. Any defects in the installation of studio floors, walls and fittings can have a critical effect on the quality of programme production. When building the studios and attached control rooms, the utmost care must be taken to ensure the airtightness to maintain sound insulation performance.

3) Dispatch of Specialists

There are practically no specialists in Tanzania in those areas of the Project that require special skills, i.e. installation of broadcasting equipment, noise insulation and sound absorption finishing of studios, fitting of sound proof doors, construction of steel towers and antennas, and so on. Therefore, specialists from either Japan or a third country shall be dispatched as appropriate during the implementation of the above works, and technical transfer to the local workers will be carried out in the form of on-the-job training.

4) Use of Local Contractors

About 60 companies are currently registered as contractors at the Ministry of Works in Tanzania, the majority of which are contractors having Tanzanian nationality. However, because the construction industry itself is not active in Tanzania, there are unfortunately few contractors that are equipped with sufficient skills. In addition, since the country is still relying on assistance from other countries for development, many of the important government buildings and high-rise buildings that were built in the recent years have been contracted by a handful local subsidiaries of foreign capital (mostly South Africa and Europe). Local subcontractors for the building construction of the Project is likely to be selected from these foreign capital

companies.

### **3-1-2 Implementation Conditions**

#### **(1) Consideration for Natural Conditions**

The rainfall in Dar es Salaam where the Project is planned averages at about 100mm a month or 1,140mm a year. However, rainfall is concentrated in the heavy rain season from late March to mid-May. A total of 200 to 300mm of monthly rainfall is recorded during this period. Since the earth works and concrete works are expected to coincide with the heavy rain season owing to the progress of the Project, all such possible countermeasures shall be taken as drainage plan within the construction sites, curing of excavated areas, adjustment of time for casting the concrete, etc.

#### **(2) Procurement of Materials and Equipment**

Construction materials that can be procured in Tanzania are limited to basic materials such as concrete, concrete blocks and lumber. The majority of interior and exterior construction materials, facilities and equipment that are on the market are imported from South Africa and Western countries and their procurement is not necessarily stable. In particular, it has been reported that procurement of custom made items and special interior materials would require considerable amount of time before they can be imported when ordered through local agents. Since it is anticipated that broadcasting equipment, special works for broadcasting, construction facility equipment and studio interior materials will be procured from Japan or a third country, it would be wise for the contractors to perform the procurement of these materials and equipment on their own. In addition, sufficient information shall be collected in advance on the import procedures and the amount of time required.

#### **(3) Coordination with Government Agencies Involved in Construction**

Government agencies that will be involved in the building construction include the Ministry of Works, the Tanzania Electric Supply Company (TANESCO), the Dar es Salaam Water and Sewage Authority (DAWSA) and the Department of Fire & Rescue Force for the content of construction, and the Commissioner of Customs and the Value Added Tax Department (which are lower branches of the Tanzania Revenue Authority) for import and procurement of materials. RTD shall conduct sufficient research in advance with these agencies with regard to various measures that need to be taken on the

client side. Proper measures according to the progress of construction shall be desired.

The Ministry of Works is currently applying the British Standard (BS) for legal control concerning construction and design and the international (American) standard laid down by the Institute of Electrical and Electronics Engineers (I.E.E.E. Regulations) for electrical facilities.

(4) Considerations for Operation of Existing Studios

The new studio building will be built next to the existing broadcasting centre. The existing broadcasting centre will be broadcasting for 19 hours every day from early in the morning till late at night during the building construction and equipment installation works. Therefore, there is a possibility that the noise and vibration arising from the construction would become an impediment to production of normal radio programmes. The building construction contractors shall report the schedule for operating heavy machinery that would generate noise and vibration to RTD in advance. At the same time, RTD shall also make adjustments to prevent the overlap of operating hours of heavy machinery with the hours of live broadcast as much as possible. Access of heavy machinery to the construction site from inside the existing facilities shall be prohibited. Heavy machinery shall enter directly to the construction site from the road on the east side of the RTD premises.

(5) Relocation of existing broadcasting equipment to the new studio block that should be performed by the RTD side and switching from the old studio to the new studio that should be performed by the Japanese side in conjunction with the equipment installation work need to be performed in a short time of 5 hours when broadcast is in recess. For this reason, it is vitally important to make advance preparations in full (conducting a rehearsal if necessary) in an effort to take all possible measures to prevent disruption of broadcast under any circumstances.

### **3-1-3 Scope of Works**

In the case where the Project is implemented under the grant aid system of the Government of Japan, the work responsibilities to be shared between the Government of Japan and the Government of Tanzania shall be as follows.

- (1) Works to be conducted by the Japanese Side
  - 1) Construction of RTD New Studio Block  
Including supply and installation of building ancillary equipment, such as emergency generators and air conditioning facilities
  - 2) Construction of Kunduchi Transmitting Station Building  
Including supply and installation of building ancillary equipment, such as emergency generators and air conditioning facilities
  - 3) Procurement and installation of broadcasting and transmission equipment to the both buildings above (including supply of spare parts)
  - 4) Construction of self-supporting steel tower for programme transmission unit (32m high for Kunduchi Transmitting Station and 52m for RTD New Studio Block).
  - 5) Construction of new transmitting antennas including tower themselves, antenna matching huts and security fences surrounding those structures and foundations
- (2) Works to be conducted by the Tanzanian Side
  - 1) Kunduchi Transmitting Station Items
    - (a) Construction of macadam paved driveway, boundary fences for the building and a guard house
    - (b) Removal of 2 existing antenna at Kunduchi transmitting station
    - (c) Securing construction sites for Kunduchi Transmitting Station Building
    - (d) Shifting the existing power and telephone lines that run in parallel along the approach road to the existing station building

2) RTD New Studio Block Items

- (a) Removal of the existing boundary walls at south side of the RTD Studio Centre, adjoining the construction site
- (b) Construction of a connecting corridor between the existing buildings and the new building
- (c) Securing construction site for RTD New Studio Block
- (d) Shifting the existing power line that runs in parallel to the fences on the south side of the existing facility
- (e) Construction of macadam paved driveway/parking space, new boundary walls and a emergency gate around the site for RTD New Studio Block
- (f) Relocation of existing equipment to be used for RTD New Studio Block (transmitter, transmitting antenna, medium wave/short wave/FM receives, radio communication facility etc.)
- (g) Installation and wiring work of equipment installed inside the existing buildings (interphones, sub clocks, wall mounted speakers, etc.)

3) Common Items

- (a) Preparation of access road to the required location at both sites (if necessity)
- (b) Supply and connection of commercial power to the required points in the buildings
- (c) Connection of water supply to the required location at both sit
- (d) Preparation of the facilities in the new buildings, such as telephone, furniture, utensils, gardening, etc. if necessary
- (e) Securing of construction and stockyard spaces necessary for construction of buildings and for installation of the equipment
- (f) Acquisition of all legal permits and approvals required in Tanzania for implementation of the Project
- (g) Tax exemption for imported construction materials and broadcasting equipment for the Project
- (h) Issuance of Authorization to Pay (A/P) and the payment to the Tanzanian bank for the commission on opening of A/P
- (i) Appropriate and efficient maintenance and management of the buildings and equipment to be granted to Tanzania



- (j) Other all execution of responsibilities in Tanzanian side, stipulated in E/N

### **3-1-4 Consultant Supervision**

#### **(1) Basic Concept of Supervision**

The consultant shall form a project team to carry out the detailed design and supervision based on the purport of the basic design, and shall aim for the smooth completion of the project. The basic concept of the supervision is described below.

- 1) The consultant shall coordinate closely with the respective agencies in charge of building construction and equipment installation, and shall make the utmost effort to ensure that the works are completed without delay.
- 2) The consultant shall report the progress of works to the related agencies in both countries to prevent inconsistency between these agencies in their understanding of the situation, and shall strive to realize smooth progress of the works by giving prompt response and advice to inquiries from contractors.
- 3) The consultant shall aim for technology transfer towards the related parties of Tanzania to demonstrate the effect of grant aid and offer sufficient explanation as appropriate regarding not only the purport of the building and equipment design but also construction and installation method in both fields and their technology.

#### **(2) Details of Supervision**

The contents of the supervision by the consultant are described below.

##### **1) Services Relating to Tender and Contracts**

The consultant shall engage in preparation of detailed drawings, specifications and other tender documents, prequalification for building contractors, dealings with tenderers from publication of bidding to opening/closing the tenders, evaluation of tenders and selection of contractors, preparation of contract agreement, contract negotiations and witnessing of the signing of contracts. All the processes, circumstances and results of tenders shall be reported by the Consultants to all the parties concerned in both countries.

2) Examination and Approval of Contractors Submittals

The consultant shall examine and approve all the documents submitted by the Contractors in accordance with the specifications, such as work execution plan, implementation time schedules, manufacturers and shop drawings, technical documents, samples, etc.

3) Supervision of Works

The consultant shall dispatch supervisors as appropriate during the construction and installation period to monitor whether the work is being performed in accordance with the specifications, and shall give the contractors appropriate instructions in order to keep the smooth progress of the works. The consultant shall prepare a report every month regarding the status of work progress and seek thorough understanding of situation among related parties.

4) Cooperation Relating to Procedure for Payment Approval

The consultant shall review and approve the contents of payment requests presented by contractors relating to the payment of contract prices to be paid during or at the end of the works.

5) Tests and Inspections

The consultant shall inspect all the materials and the equipment in the factories prior to shipment. Not only the factory inspection but also all the tests and inspections to be performed during construction/installation period including final acceptance test, shall be made in presence of or by the consultant. The consultant shall approve when results of tests and inspections conform to the drawings and specifications and give proper instructions when the results are otherwise. The results of various tests inspections shall be included in the monthly progress report with his comments as appropriate and reported to the related parties.

6) Assistance in Handing-Over Formalities

The consultant shall compile the final acceptance test report while reviewing and approving the contractor's submittals for handing-over the building and the equipment, such as keys, spare parts, operation and maintenance manuals of the building and broadcasting equipment, guarantee letters, etc. In addition, the consultant shall offer proper advice to RTD with regard to efficient use of the

handing-over items and proper maintenance and management of the buildings and the equipment..

(3) Supervisors Arrangement

1) Building Construction

The Project is an integrated project including building construction and equipment installation, and RTD New Studio Block to be constructed is a technical building requiring high skilled technical staffs in supervision as well as construction itself. Supervision by the consultant must be performed by coordinating with the equipment requirements as required while grasping the overall construction status and by maintaining close cooperation with concerned agencies of both the governments, the building contractors and the equipment suppliers so that the process can be observed while securing the quality of the building. For this reason, dispatch of a permanent supervisor for construction, who shall stay in Tanzania during construction period, is quite essential. This needs to be planned in conjunction with dispatch of short term supervisors in charge of structural engineering and building equipment. Having broad perspective and coordinating capacity in addition to ample experience and adequate technical abilities shall be essential conditions for selection of the staffs.

2) Equipment Installation

The 114m high medium wave direction antennas to be constructed at Kunduchi transmitting station are towers that serve as an antenna in itself and are important equipment positioned at the core of the Project. A large scaled radial shaped earth wires shall be buried in the ground areas having the same width as the height of the antenna and three times its expanse, under two sets of branch line antenna. Antenna matching huts accommodating antenna tuning unit, etc. shall also be constructed at the bottom of respective antenna tower. In addition, fences will be built around the tower because inadvertent access is extremely dangerous due to high electric potential of the antenna tower. Thus the volume of overall work is quite large and is estimated to require eight months as the construction period.

For this reason, the construction of antenna at Kunduchi transmitting station must commence during the building construction without waiting for its completion. Since the work has high degree of difficulty and is accompanied by risk, dispatch of permanent supervisor specializing in antenna construction during the construction

period is indispensable.

The equipment installation for Transmitting Station Building and RTD New Studio Block shall start after completion of the building. Installation of such equipment would require a total of two months to complete. During this period, one supervisor will be dispatched to each category of supplied equipment, such as transmission facility, studio equipment and program transmission as appropriate according to respective work period. In addition, general manager controlling the overall equipment installation shall be dispatched on a periodical basis during the medium wave antenna construction period and on a permanent basis during the installation work inside the buildings for the purpose of realizing smooth handing-over to RTD by providing proper guidance and advice to contractors and respective RTD's staffs those who are responsible in operation of the supplied equipment.

### **3-1-5 Procurement Plan**

#### **(1) Construction Materials**

As mentioned in Paragraph 3-1-2 of this chapter, the majority of construction materials are imported from South Africa and Western countries with the exception of basic materials such as concrete and lumber. Therefore, the construction materials for the Project shall be comprised of locally procured items including imported items as a rule, although materials with questionable quality, materials with limited variety and materials with unstable supply shall be procured from Japan or a third country. Nevertheless, for selection of emergency generators and air-conditioning facilities that require regular maintenance, priority shall be given to products from companies having local agents capable of performing periodical inspection and supply of spare parts. In addition, local procurement shall also be a prerequisite for materials that are of highly expendable nature such as lighting apparatuses, socket outlets and switches.

List of sources for main construction materials are shown in Table 3-1-1 in the next page.

Table 3-1-1 List of Sources for Main Construction Materials

Materials	Source of Procurement			Reasons and Remarks
	Local	Third country	Japan	
(Structural & Finishing Materials)				
<ul style="list-style-type: none"> <li>· Sand</li> <li>· Cement</li> <li>· Aggregate</li> <li>· Reinforcing bar</li> <li>· Structural steel</li> <li>· Concrete block</li> <li>· Lumber</li> <li>· Roofing material</li> <li>· Aluminum window</li> <li>· Steel door</li> <li>· Sound insulation door</li> <li>· Wooden door/window</li> <li>· Glass</li> <li>· Plastering material</li> <li>· Paint</li> <li>· Metal suspension system for ceiling</li> <li>· Ceiling board</li> <li>· Studio Interior finishing material</li> </ul>				<p>Pit sand available</p> <p>Products conforming to BS available</p> <p>No problem in terms of hardness, grading and supplied quantity</p> <p>High merit in terms of both quality and price</p> <p>High merit in terms of both quality and price</p> <p>Cement roofing tile is planned to be used</p> <p>Imported from South Africa</p> <p>Imported from South Africa</p> <p>Securing quality and performance</p> <p>Imported from South Africa</p> <p>Only the glass for sound insulation doors/windows procured from Japan</p> <p>Imported from South Africa and the West</p> <p>Imported from South Africa and the West</p> <p>Imported from South Africa and the West</p> <p>Securing quality, performance and reliability of supply</p>
(Building Ancillary Equipment)				
<ul style="list-style-type: none"> <li>· Distribution board</li> <li>· Electric wire/cable</li> <li>· Lighting fixture</li> <li>· Air conditioning equipment</li> <li>· Pump</li> <li>· Emergency generator</li> </ul>				<p>Securing quality, performance and reliability of supply</p> <p>Securing quality, performance and reliability of supply</p> <p>Imported from South Africa and the West</p> <p>Securing quality, performance and reliability of supply</p> <p>Securing quality, performance and reliability of supply</p> <p>Imports from U.K. and the U.S. available</p>

(2) Equipment

It would be most appropriate to procure the equipment for broadcasting and transmission equipment comprised of state-of-the-art from Japan based on a comprehensive viewpoint of securing quality, reliable supply and technical follow-up after completion and delivery. Meanwhile, it would be appropriate to rely on local procurement for all supplementary facilities such as antenna matching huts and fences around antenna towers.

(3) Transportation from Japan

The landing port for materials procured in Japan is Dar es Salaam, the capital city of Tanzania. Conventional vessels and container vessels have regular service from Japan. The former runs once a month and the latter operates via Singapore where container cargo is reloaded on container vessels bound for East Africa at intervals of almost one week. Both conventional and container vessels require approximately one month for the transportation.

Vast majority of materials procured in Japan are precision broadcasting equipment and special interior finishing materials for studio use. Use of container vessels would be appropriate in view of frequency of service, special nature of transported items that cannot be easily replaced and security issue during overland transportation. However, it would be appropriate to use conventional vessels for reinforcing bars in view of the fact that their procurement from Japan was decided on the basis of low price and the form of transport.

Dock work and customs clearance work in Dar es Salaam are being performed somewhat smoothly with rare occurrence of waiting offshore. Rather, the problem lies in whether the tax exemption procedure with regard to customs duty and value added tax would be performed without delay by the time the materials arrive. Proper offering of information from contractors to RTD with sufficient leeway of time and prompt response by RTD are indispensable with regard to this point.

### **3-1-6 Implementation Time Schedule**

Implementation time schedule for the Project is as shown on Table 3-1-2. It is estimated that a total of 20 months will be needed from signing of the consultant agreement until completion and handing-over the buildings and the equipment. Their details are as follows.

- From signing of the consultant agreement until commencement of the work: 7 months (required period in Table 3-1-2 plus 1 month for contract verification process)
- Equipment supply and installation goes side by side with the building construction. It is expected to the completion of equipment installation that 1 month deviates in relations of waiting for the completion of building construction though installation period of each construction is 12 months as it is shown in the Table 3-1-2.

Table 3-1-2 Implementation Time Schedule

		1	2	3	4	5	6	7	8	9	10	11	12
Detailed Design and Tendering Stage												(6 months in total)	
	Building Construction											(12 months in total)	
Procurement and Construction Stage	Supply and Installation of the Equipment											(12 months in total)	



### **3-2 Operation and Maintenance Plan**

Maintenance problem of the new equipment is quite unlikely because RTD staff has been efficient in their management since the broadcasting started in 1951.

To the studio equipment, 10 maintenance personnel and 46 operation personnel are assigned.

As for each transmitting station, the operation/ maintenance is done by shift duty.

A RTD annual budget is made based on the examination result of each local station that requests for the estimate budget before submitting to the Government.

The operation and maintenance expense after this enhancement plan is enforced, the increase in the personnel expenses, the lighting and fuel expenses, the maintenance repair expenses of the equipment and others is anticipated.

The income and costs balance against the operation and maintenance cost increased by this enhancement project is examined as follow.

#### **(1) Labors Cost**

At the Studio, the enhancement project team will reshuffle the staff so that additional maintenance crew is not necessary.

Pugu Road and Mabibo Transmitting Station in the suburbs of Dar es Salaam can be suspended for the Radio Transmitter service when Kunduchi Transmitting Station starts its service.

Thus with the reshuffling of the crews with the above, The Operation and Maintenance Crew of Kunduchi Transmitting Station can be obtained without new employment.

#### **(2) Lighting and Fuel Expense**

##### **1) The calculation of the electric charges**

Increase in the electric power consumption of RTD Broadcasting Centre and Kunduchi Transmitting Station are anticipated by execution of this enhancement

plan.

However, the decrease of the electric consumption is anticipated with Pugu Road and Mabibo Transmitting Station so that operation may stop for the medium wave transmitter and the power consumption of existing studio because 5 studios out of the 8 existing studios are stopped operation by the completion of this project.

Electric charges were calculated as per Table 3-2-1 as a calculated condition of :-

- 2.7Tsh per 1kW
- Operation hours were 20 hours

Table 3-2-1 Calculation of Electric Power Consumption

(K Tsh)

Project site	Increase	Decrease	Note
New Studio block	5,322	Nil	ST-I, II, III, IV & V Operation start
Existing Studio block	Nil	99	ST-1,2,3,5,Y Operation stop
Kunduchi Station	4,829	Nil	MF100kW Operation start
Mabibo Station	Nil	398	MF10kW Operation stop
Pugu Road Station	Nil	434	MF10kW&1kW Operation stop
Total	10,170	931	Increase 9,239

2) The calculation of the water supply

At RTD Broadcasting Centre, well water is used hence electric power fee of the pumping water is considered. However, some cost increments are anticipated for the Kunduchi Transmitting Station.

3) Maintenance Repair Expenses

It is common that the Japanese Broadcasting Station sums up about 1% of the present value of the equipment for the maintenance expenditure for 1 year.

When reference to the above, 1% of 600,000,000yen, about 6,000,000yen (45,000K Tsh) become necessary for annual budget.

However, the enhancement plan include 2 years spare parts, the maintenance expenditure can be minimized.

For instance, if this enhancement plan is completed in 2001, the Maintenance expenses calculated for about 45,000K Tsh becomes necessary from years 2004 when the supplied spare parts have been used.

4) Operation and Maintenance Cost after the commissioning of the Project

· Increase of Operation and Maintenance Cost

Lighting and Fuel	9,535K Tsh
- Electric Expense	(9,239K Tsh)
- Water Supply	(296K Tsh)
Repair Expense ( starts from 2004 )	45,000K Tsh
<hr/>	
Total	54,535K Tsh

· Development Expense

Kunduchi Transmitting Station

(Dismantling of existing antenna) 114,000K Tsh

Thus, if 9,535K Tsh by April, 2003 and 54,535K Tsh by April, 2004 is ensured, the balance of ordinary revenue and expenditure can be kept for the starting.

On the other hand, Kunduchi Transmitting Station's dismantling expenditure of the existing antenna is transient expenditure, hence it is not taken into consideration for the maintenance expense.

Development Fund of 114,000K Tsh (about = 15000000 yen) shall be allocated by June, 2001 that the antenna construction by the Japanese side begins.

5) Consistency with the RTD budget plan against the increase of the operation and maintenance fee

The income of RTD consists of advertising income and Government Fee (personnel expenses) mainly, and a balance of the budget is returned to the treasury after the settlement.

For Table 3-2-2, the budget until 2001/ 2002 years was settled on by RTD and the budget after 2001/ 2002 was estimated by consultant based on the way of RTD and the above management expenses were added as for the expenditure bone by the project.

Table 3-2-2 RTD Ordinary Revenue and Expenditure

( Unit:K Tsh)

Item	Financial Year				
	Pre-Implementation	After-Implementation			
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004
Ordinary revenue					
-Delayed income	1,247	1,101	1,157	1,101	1,1567
-Commercial (rate increase)	866,153	952,768	1,048,045	1,152,850	1,325,777
-Others					
Total	867,400	953,869	1,049,202	1,153,951	1,326,934
Government Fund					
-Labours Fee (rate increase)	325,492	358,041	393,845	433,230	476,552
Total	325,492,400	358,041,600	393,845,800	433,230,380	476,553,418
Ordinary Expenditure					
-Labours Fee (rate increase)	325,492	358,041	393,845	433,230	476,552
-Training Fee (rate increase)	18,760	20,636	22,700	24,970	27,467
-Transportation Fee (rate increase)	1,001	1,101	1,211	1,332	1,466
-Outstation Fee (rate increase)	94,415	103,857	114,242	125,666	138,233
-Government Hospitality Fee (rate increase)	1,000	1,100	1,210	1,331	1,464
-Office and General (rate increase)	85,283	93,811	103,192	113,512	124,863
-Operation and Maintenance Fee (rate increase)	28,500	31,350	44,020	48,422	53,264
-News Service Fee (rate increase)	50,000	55,000	60,500	66,550	73,205
-Material Expenses (rate increase)	207,000	227,700	250,470,	275,517	303,069
-Building and Repair Fee (rate increase)	225,591	248,150	272,965	300,262	375,327
-Sales Promotion (rate increase)	47,500	52,250	57,475	63,223	69,545
-Medical & Sports (rate increase)	21,801	23,981	26,379	29,017	31,919
-Others (rate increase)	77,128	84,841	93,325	102,657	112,923
Total	1,183,471	1,301,818	1,441,535	1,585,688	1,789,296
Grand Total	9,421	10,093	1,513	1,493	1 4,190

Item	Financial Year				
	Pre-Implementation	After-Implementation			
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004
Government Fund for Development					
Renewal of Mwanza, Mbeya & Arusha and others	1,600,000				
Local cost for the DRS & Kunduchi		114,000	67,500		
Total	1,600,000	114,000	67,500		

As this result, it was found that the balance of income and costs of every year is kept well.

However to satisfy this condition, 10% increase of advertising income becomes a subject to RTD

In order to increase the advertising income, RTD shall be used General Broadcasting and the PRT broadcasting channel so as to promote a broadcasting enterprise.

The following are the subject for the improvement.

- (a) By using the new machine, produce good program abundantly with quality of sound.
- (b) By using the function of the new studio fully, Sound effect machine, High Fidelity Mixing Console and CD, and Digital Equipment of DAT & MD, produce attractive program for the listeners.
- (c) Produce more education and enlightenment program based on the listeners oriented in a cooperation such as school, a university, and governmental department concerned.
- (d) In consideration of quality of commercial program, in the genre of culture, latest science, latest catch word, latest music, assign more staff for the developing new market so as to obtain 10% increase of the revenue.

## **Chapter 4**

### **Project Evaluation and Recommendation**

## **Chapter 4 The evaluation of the project and suggestion**

### **4-1 Authentication of the validity**

#### **4-1-1 Expected substantial effect**

Following effects are expected on the execution of this plan.

##### **(1) The present circumstances**

As for RTD General Broadcasting, the Kunduchi Transmitting Station's Service has been stopped due to decaying of equipment.

Though a substitute service is done from Pugu Road Transmitting Station and Mabibo Transmitting Station, the Service Area is limited to about a radius 20km around Dar es Salaam.

The quality of sound of the studio output declines due to the decay of the studio equipment.

Hence, it is difficult to fulfill a scope as a public broadcasting because the decline of the listener's rating is remarkable with the rivalry of the commercial broadcasting station that majors in the entertainment program.

(2) Benefit ability

This plan consists of the renewal of Kunduchi Transmitting Station and Broadcasting Centre.

The beneficiary by the execution of this plan become as per the Table 4-1-1 according to the district given below.

Table 4-1-1 Number of Beneficiary

( population in thousand )

District	Beneficiaries by Kunduchi Transmitting Station		Beneficiaries by Broadcasting Center
	Present	After execution	After Execution
Dodoma			1,505
Arusha			1,851
Kilimanjaro			1,802
Tanga		1,500	(1,554) 1454
Morogoro		1,500	(1,559) 1059
Coast	200	757	757
Dar es Salaam	2,039	2,039	2,039
Lindi		760	760
Mtwara		900	990
Ruvuma			(1,035) 500
Iringa			(1,513) 1013
Mbeya			1,916
Singida			(974) 674
Tabora			(1,263) 100
Rukuwa			(996) 100
Kigoma			(1,076) 576
Shinyanga			(2,259) 1,959
Kagera			1,705
Mwanza			2,331
Mara			1,237
Total	2,239	7,456	24,328

Note The bracketed figure is an district population. (Referred Bureau of Statistics Aug,1998)

Referring to Table 4-1-1 Beneficiary, the Direct effect can be expected as follow.

- 1) The beneficiaries by renewal of Kunduchi Transmitting Station are about 7,400,000 peoples.



- 2) The beneficiaries by renewal of Studio Brock are about 24,000,000 peoples.

By developing various syllabus for the school broadcasting and education enlightenment activity, public broadcasting can bring benefit to the undeveloped area.

- (a) It will be able to supply
  - a) the appropriate educational materials to where it is insufficient
  - b) information concerning education instantly / simultaneously also to districts where transportation means are not organized.
- (b) The curriculum development of school broadcasting will make up for the deficiency of teachers in the field such as science, geography, and international circumstance.
- (c) It will enrich the education in remote places, and it will contribute to correct the area gap of the education.
- (d) Reports on agricultural information by the area (about sowing time, pest extermination, manure sprinkling, harvesting and etc) can be expected.
- (e) Malaria eradication movement and AIDS countermeasure are subjects dealt as a country. Education / enlightenment activities about this could be executed most effectively by the radio and great effects are expected with this equipment renewal plan.

#### 4-1-2 The diffusion of the education and it's application

From its natural conditions, abundant mineral resources and tourist resources, Tanzania has already been presumed as a very eminent country in Africa. The name GNP, however, was \$210/person and the total \$6,632 million in 1997 and this shows that Tanzania has resigned in the stage of Least Developed Countries (LDC). The education and society reform has delayed due to the slow progress of the national consciousness in the background of its underdeveloped infrastructure. It is mentioned that this is becoming fetters to the economic development and the establishment of prosperity and welfare nation aimed by the Tanzanian government. The importance of broadcasting is realized again for generalizing information / education and for improving the efficiency in the vocational training.

The General broadcast which will be transmitted from the new RTD studio block established in this plan, will be sent to Mwanza, Arusia, Kigoma, Dodoma, Mbeya, Songea, Nachingwea and the Kunduchi Transmitting Station. This means that the benefit will be in a national scale.

The assumed benefited population in each program is shown below.

Table 4-1-2 Population distribution <<Male>>  
Household Budget Survey Issue1996

(unit: population)

AGE	DSR	Local Cities	Small /Medium size cities	Villages	Total
0	9,791	21,900	36,396	229,582	297,669
1-4	33,749	75,936	160,584	1,054,329	1,324,598
5-9	82,635	115,611	250,234	1,334,521	1,783,001
10-14	69,806	106,738	196,683	1,255,658	1,628,885
15-19	86,259	101,310	171,108	971,958	1,330,635
20-24	60,778	45,681	125,035	645,747	877,241
25-29	50,515	76,445	92,981	536,731	756,672
30-34	45,740	45,103	79,845	473,351	644,039
35-39	41,794	37,919	87,512	427,155	594,380
40-44	31,403	32,296	56,626	301,031	421,356
45-49	25,361	29,961	65,906	291,428	412,656
50-54	17,489	20,820	48,315	218,016	304,640
55-59	8,989	8,614	46,001	209,297	272,901
60-64	5,648	6,122	21,184	176,148	209,102
65+	7,600	19,068	34,033	289,715	350,416
others	4,425	10,225	41,506	119,244	175,400
Total	581,982	753,749	1,513,949	8,533,911	11,383,591

1991/1992 investigations

Table 4-1-3 Population distribution <<Female>>  
Household Budget Survey Issue1996

(unit: population)

AGE	DSR	Local Cities	Small /Medium size cities	Villages	Total
0	11,864	25,992	41,707	237,780	317,343
1-4	40,461	63,939	165,403	1,055,942	1,325,745
5-9	87,352	120,964	207,037	1,289,244	1,704,597
10-14	73,618	129,187	193,424	1,162,526	1,558,755
15-19	95,695	122,302	190,278	1,063,327	1,471,602
20-24	67,145	77,571	135,776	756,566	1,037,058
25-29	66,223	81,184	147,592	698,092	993,091
30-34	39,488	51,186	114,906	483,500	689,080
35-39	42,131	42,290	81,678	482,158	648,257
40-44	19,349	42,791	58,151	290,216	410,507
45-49	11,825	17,061	63,686	277,507	370,079
50-54	6,344	12,121	30,359	234,809	283,633
55-59	4,167	7,996	10,765	141,252	164,180
60-64	2,012	2,705	16,302	123,917	144,936
65 +	4,412	10,467	25,262	213,489	253,630
Others	7,036	9,061	32,101	189,405	237,603
Total	579,122	816,817	1,514,427	8,699,730	11,610,096

1991/1992 investigations

Referring to above Household Budget Survey, 1991/92, the assumed listening population in each program of RTD general broadcast are as follows.

Table 4-1-4 Estimated listening population

(unit: population)

Broadcasting type	Year 1991			Adjustment rate	Year 1997
	Male	Female	Total		listening population
School Broadcasting (elementary school)	3,411,886	3,030,342	6,442,228	1.37	8,825,852
School Broadcasting (Secondary school)	1,330,635	1,471,602	2,802,237	1.37	3,839,065
Adult education	4,283,885	4,431,705	8,715,590	1.37	11,940,358
Broadcasting for general purpose	9,552,222	9,496,395	19,048,617	1.37	26,096,605

Note: Adjustment ratio = population 1997/population1991

To judge from the problems and the conditions of receiver diffusion mentioned in this interview with the Ministry of Education, whether School Broadcasting succeed or not depends on how it is managed.

The key for School Broadcasting to have a successful effect on such problems is the radio texts published according to the curriculum of the Ministry of Education, since the diffusion rate of radio receiver today is 4 people per receiver.

<<Reference data>>

· Expected effects on School Broadcasting

- 1) To reinforce the fields that are short of teaching materials / textbooks.
- 2) To support private secondary school students to learn equally with public secondary school students.
- 3) To provide useful knowledge / information to the student who attends correspondence education.
- 4) To provide the latest knowledge / information to the teachers especially in science field.
- 5) To provide educational programs which will be useful for training the abilities of students / children.
- 6) To transmit technical / vocational information which raises the teacher's degree of knowledge / skill.
- 7) To transmit the latest information of the education field to the teachers in remote places.
- 8) To provide complementally teaching materials to the students of Teachers' Colleges.

· Radio diffusion number

According to the above-mentioned Household Budget Survey 1991/92 (March96 issue), 1.6 million radio and radio with cassette are possessed in Tanzanian home. The rate was 1 radio to 10 listeners on 1991, but it had improved to 1 to 4 inhabitants, according to the World Telecommunications Visual Data Book, 2000.

The RTD program composition is shown bellow.

	RTD General Broadcast program ( % )							
	News	School Broadcasting	Education / Enlightenment	For children	Religion	Culture	Amusement	Sports
At the present	24	0	35	2	2	7	20	10
After the renewal plan	24	20	30	2	4	5	10	5

70% of the broadcasting time are used for education / enlightenment presently and there will be no trouble of management / control in stations concerning the program producing / editing. However, on restarting the School Broadcasting, the support from the School Education Committee of the Ministry of Education may be necessary partially in program producing.

<<Reference data>>

Producing of syllabus -Cooperation by the School Education Committee of the Ministry of Education is indispensable.

Recording 3 existing RTD Studio + New Studio

Editing ditto

Producing ditto

As it is mentioned before, Tanzania has been one of the first rank countries in Africa from its natural conditions, abundant mineral resources, tourist resources, and also from its literacy. However, its backbone of the economy is agriculture, which is easily influenced by the fluctuation of market price. Also, the progress of the national consciousness is slow due to its underdeveloped infrastructure. This is becoming fetters to the economic development and the establishment of prosperity and welfare nation aimed by the Tanzanian government. GNP per head is struggling around US\$210. Over the problems of the infrastructure such as road, railroad, and telephone, Tanzania hereby is recognising again the importance of broadcasting for generalizing information / education and for improving the efficiency in the vocational training.

We expect that this gratuitous fund aid will get higher effects with the rehabilitation of the program transmission link, which has already been put into action by self-efforts of Tanzania. Also in this project, information such as agriculture technology, sanitation control,

market price will be provided and the opportunity of education will be supplied to areas where its does not satisfy BHN because the road / communication circuit are in bad condition. This will help people to breakaway from poverty and to strengthen the mutual solidarity. It is a suitable issue as Japanese gratuitous fund cooperation.

#### 4-2 Technical cooperation / Connection with other donors

Other than the gratuitous fund cooperation, requests on technical cooperation shown below are planned by RTD.

Request for technical cooperation		Contents	Period	Connections
A1 Form	Maintenance technology	Guidance on maintenance technology for digital equipments and budget / schedule planning concerning the facility maintenance.	3 months	As for this plan, the digital format is introduced in MF Transmitter, and studio, Recorder and Reproducer (DAT, MD, CD), Sound Effect Machine, and so on. A Careful guidance to the staff is necessary for the basic digital technology and specialist dispatch is indispensable so as to function these equipment efficiently.
	Program producing	Guidance for utilizing the newly introduced equipments effectively and budget / schedule planning concerning the program producing	2 years	New Program Production Technology is to be instructed using Sound Effect Machine and others equipment introduced newly. Specialist's dispatch is also necessary for the plan to fill-in the blank period about school broadcast that was stopped these several years in RTD for a qualitative improvement of Broadcasting Program

Request for technical cooperation		Contents	Period	Connections
A2/A3 Form	Attainment of Maintenance technology	The situation of the latest broadcasting equipments and the maintenance technology.	3 months	An opportunity to learn Transmitter and Studio Equipment which uses new technology shall be given to the operator who so as to become the leader of operation and maintenance of broadcasting facilities of future RTD
	Attainment of Program producing technology	The program producing technology using the digital equipments	3 months	It is made for trainees to study for the production techniques of education and enlightenment program fully based on the school broadcast that is to resumed. Then the qualified staff could be engaged in the fulfillment of the programme contents of RTD.

Nothing was decided in this investigation period about the connection with other donors.

### 4-3 Problems

The project is very meaningful as great effects mentioned above are expected and at the same time it contributes to improve the BHN ( Basic Human Needs ) in Tanzania. However, there are problems shown below on implementing this project, and without solving them it will be difficult to operate the plan smoothly.

(1) Dismantling of the two 114m self-supporting tower in Kunduchi Transmitting Station

It is desirable that the dismantling of existing tower is completed before the start of site installation of this plan.

If the removal becomes difficult within the budget of 2000 / 2001, propagation disturbance by these towers and serious accidents by the induced power may occur.

(2) Reconstruction of the existing studio

Radio Tanzania is producing the broadcasting program of 2 channels - 19 hours using the 8 studios fully. This time, 5 out of 8 studios are going to be in the new studio block and 3 will be left in the existing studio.

When trouble occurs in securing the budget for executing these plans, producing of the necessary number of programs including the School Broadcasting may become hard.



## **Appendices**

- 1. Member List of the Survey Team**
  - (1) Basic Design Study (Oct. 1999)**
  - (2) Basic Design Study (Nov. 1999)**
  - (3) Explanation of Draft Basic Design Study (Mar. 2000)**
  
- 2. Survey Schedule**
  - (1) Basic Design Study (Oct. 1999)**
  - (2) Basic Design Study (Nov. 1999)**
  - (3) Explanation of Draft Basic Design Study (Mar. 2000)**
  
- 3. List of Party Concerned in the Recipient County**
  
- 4. Minutes of Discussion**
  - (1) Basic Design Study (Oct. 22, 1999)**
  - (2) Basic Design Study (Nov. 19, 1999)**
  - (3) Explanation of Draft Basic Design Study (Mar. 29, 2000)**
  
- 5. Cost Estimation Borne the Recipient Country**
  
- 6. Reference**

## 1. Member List of the Survey Team

### (1) Basic Design Study (Oct. 1999)

Name	Assignment	Present Post
Mr. Masashi FUJITA	Leader	Director, First Project Management Division, Grant Aid Management Department Japan International Cooperation Agency (JICA)
Mr. Yasuo TAMURA	Technical Adviser	Section Chief, International Cooperation Div., International Affairs Dept., Minister's Secretariat Ministry of Posts and Telecommunications
Mr. Yuichi MATSUSHITA	Coordinator	Staff, Third Project Management Division, Grant Aid Management Department Japan International Cooperation Agency (JICA)

### (2) Basic Design Study (Nov. 1999)

Name	Assignment	Present Post
Mr. Shinya NAKAI	Leader of Basic Design Study Team	Resident Representative, JICA Tanzania Office
Mr. Yoshihiro NOHARA	Chief Consultant / Broadcasting Plan	NHK Integrated Technology Inc.
Mr. Takeshi SATO	Broadcasting Facility	NHK Integrated Technology Inc.
Mr. Susumu TOYODA	Transmitting Facility	NHK Integrated Technology Inc.
Mr. Akira SHIRAI	Construction Design	Nissoken Co., Ltd.
Mr. Seiichi UEDA	Implementation Schedule, Procurement Plan, Cost Estimation	NHK Integrated Technology Inc.

(3) Explanation of Draft Basic Design Study (Mar. 2000)

Name	Assignment	Present Post
Mr. Shinya NAKAI	Leader of Basic Design Study Team	Resident Representative, JICA Tanzania Office
Mr. Yoshihiro NOHARA	Chief Consultant / Broadcasting Plan	NHK Integrated Technology Inc.
Mr. Takeshi SATO	Broadcasting Facility	NHK Integrated Technology Inc.
Mr. Susumu TOYODA	Transmitting Facility	NHK Integrated Technology Inc.
Mr. Akira SHIRAI	Construction Design	Nissoken Co., Ltd.

## 2. Survey Schedule

### (1) Basic Design Study (Oct. 1999)

Date			Fujita Leader	Tamura Technical Adviser	Matshita Conrdinator
1	10/16	Sat	Preliminal Study Team Member of Improving Plan for Primary School Facility	Lv. Narita	
2	17	Sun		Av. Dar es Salaam Internal Meeting	
3	18	Man		Meeting at JICA Office	
4	19	The		Discussion on project at RTD	
			Site (Kunduchi ) Survey, Courtesy call on Embassy of Japan		
5	20	Wed	Discussion on Draft M/D, Preparing M/D		
6	21	Thu	Internal Meeting, Preparing Report		
7	22	Fri	Signing of M/D, Report to Embassy of Japan and JICA Office, Meeting on Ministry of Education, Lv. Dar es Salaam		
8	23	Sat		↓	
9	24	Sun		Av. Narita	

(2) Basic Design Study (Nov. 1999)

Date			Official Member	Consultant				
			Nakai Leader	Nohara Chief Consultant	Sato Broadcasting Facility	Toyoda Transmitting Facilitate	Shirai Construction Design	Ueda Cost Estimations
1	11/8	Man		Lv. Narita				
2	9	Tue	Courtesy call on EOJ	Av. Dar es Salaam, Courtesy call on Embassy of Japan, JICA Office				
3	10	Wed	Courtesy call on Prime Minister's Office and RTD					
4	11	Thu	Prime Minister's Office and RTD, Review of the Project, Explanation of IC/R					
5	12	Fri		<ul style="list-style-type: none"> <li>Q and A on related organization of the Project</li> <li>Visiting, other broadcasting</li> </ul>	<ul style="list-style-type: none"> <li>Inspection of existing facilities and equipment in Studio center and transmitting station (kunduchi, Mabibo, Pugu road)</li> </ul>			
6	13	Sat						
7	14	Sun						
8	15	Man						
9	16	Tue						
10	17	Wed						
11	18	Thu	Confirmation of Draft of M/D					
12	19	Fri	Signing of M/D, Report to Embassy of Japan and JICA Office					
13	20	Sat		<ul style="list-style-type: none"> <li>Inspection of management system</li> <li>Administration</li> <li>Accounting</li> <li>Personnel Management</li> </ul>	<ul style="list-style-type: none"> <li>Inspection of broadcasting programs (Studio Center)</li> <li>Programming plan</li> <li>Programme production system</li> </ul>	<ul style="list-style-type: none"> <li>Operation and Maintenance (Kunduchi)</li> <li>Inspection of operative order of transmitting equipment</li> <li>Inspection of operative order of STL system</li> </ul>	<ul style="list-style-type: none"> <li>Survey of Project site</li> <li>Survey of infrastructure</li> <li>Confirmation of building plan</li> <li>Confirmation of the related site plan</li> <li>Confirmation of related law and regulation</li> <li>Collection of data on Meteorological conditions</li> <li>Selection of geological measurement</li> </ul>	<ul style="list-style-type: none"> <li>Assistance for survey of project site</li> <li>Investigation on local purchase of materials</li> <li>Collection of data on cost estimation</li> <li>Survey of building construction method</li> <li>Survey of wholesale agency for equipment</li> <li>Assistance for measurement of medium wave propagation</li> </ul>
14	21	Sun						
15	22	Man						
16	23	Tue						
17	24	Wed						
18	25	Thu						
19	26	Fri						
20	27	Sat						
21	28	Sun	<ul style="list-style-type: none"> <li>Information Gathering</li> <li>Achievement of Educational Broadcasting</li> <li>Diffusion of educational broadcasting</li> <li>National Development plan and other donor's plan</li> <li>Programme production by other organization</li> </ul>		<ul style="list-style-type: none"> <li>Inspection of grade of service in proposed service area</li> </ul>			
22	29	Man						
23	30	Tue						
24	12/1	Wed						
25	2	Thu						
26	3	Fri						
27	4	Sat						
28	5	Sun		<ul style="list-style-type: none"> <li>Arrangement of data</li> <li>Drafting of basic design</li> <li>Review on draft of basic design</li> </ul>				
29	6	Man						
30	7	Tue						
31	8	Wed	Report to Embassy of Japan and JICA Office					
32	9	Thu	Lv. Dar es salaam					
33	10	Fri						
34	11	Sat	Av. Narita					

(3) Explanation of Draft Basic Design Study (Mar. 2000)

Date			Official Member	Consultant			
			<b>Nakai</b> Leader	<b>Nohara</b> Chief Consultant	<b>Sato</b> Broadcasting Facility	<b>Toyoda</b> Transmitting Facilitate	<b>Shirai</b> Construction Design
1	Mar.20	Man		Lv. Narita			
2	21	Tue	Courtesy call on Embassy of Japan	Av. Dar es Salaam, Courtesy call on Embassy of Japan , JICA Office			
3	22	Wed	Courtesy Call on prime Minster's Offic and RTD, Explanation of Draft Report				
4	23	Thu		Explanation of Draft Report Correction of Data for Cost Estimation			
5	24	Fri		Discussion on Draft Report Correction of Data for Cost Estimation			
6	25	Sat		Supplementary Survey			
7	26	Sun		Internal Meeting			
8	27	Man		Discussion on Draft Report Correction of Data for Cost Estimation			
9	28	Tue		Discussion on M/D Correction of Data for Cost Estimation			
10	29	Wed		Singing of M/D, Report to Embassy of Japan, JICA Office			
11	30	Thu		Lv. Dar es Salaam			
12	31	Fri		↓			
13	Apr./1	Sat		Av. Narita			

### **3. List of Party Concerned in the Recipient Country**

#### Prime Ministry's Office

Mr. Raphael O.S. MOLLEL	Tanzania Prime Minister's Office Permanent Secretary
Dr. Ben G. MOSES	Tanzania Prime Minister's Office Permanent Secretary
Mr. UNGARAO	Tanzania Prime Minister's Office Planning Director

#### Radio Tanzania Dar es Salaam

Mr. Abdul NGARAWA	Radio Tanzania Dar-Es-Salaam Director of Broadcasting
Mr. Emmanuel T. K. MANGULLAR.T.D	Chief Engineer
Mrs. Edda SANGA	R.T.D Programme Controller
Mr. Herman IPWAGA	R.T.D Deputy Chief Engineer
Mr. Ndaro NYAMWOCHA	R.T.D Head Transmitting
Mr. Edward KAHURANANGA	R.T.D Chief Editor
Mr. George NYAMIT	R.T.D Superintendent Studio Engineer
Mr. January TOGORO	R.T.D Superintendent Satellite Engineer
Mr. Edward KUILASA	R.T.D Head Studio Maintenance
Mr. James MHILU	R.T.D Head of Studio Operation
Mrs. Elesia ISABULA	R.T.D Head of General Service
Mr. Julis LUCAS	R.T.D Station in charge KUNDUCHI
Mr. Chrispin LUGONGO	R.T.D Head of Outside Broadcasting
Mr. Alli RAMADHANI	R.T.D Head of Generators
Mr. Joshua MWASENGA	R.T.D Maintenance Technician
Mrs. Assumpta MASSOL	R.T.D News Editor (Coordinator)
Mr. M. KILA	R.T.D Station in charge KUNDUCHI Tx. Station
Mr. MWANJA	R.T.D Station Technician KUNDUCHI Tx. Station
Mr. Mbeo ABDULKADIRI	R.T.D Station in charge PUGU-ROAD Tx. Station
Mr. David M. AMULI	R.T.D Assist. Station in charge PUGU-ROAD Tx. Station
Mr. Mussa M. MNASI	R.T.D Station in charge MABIBO Tx. Station
Mr. Clement F.S. MASANJA	R.T.D Assist. Station in charge MABIBO Tx. Station

#### Ministry of Education and Culture

Mr. Chales KALUGULA	M/Education & Culture Director of Policy & Planning
Mr. Leonard MPUNILWA	M/Education & Culture Head Radio Unit
Mr. Ally S.M. MWAIMU	M/Education & Culture Planning Officer
Mr. Chiprium MIYEDU	M/Education & Culture Planning Officer
Mrs. A.K. MASSABA	Institution of Adult Education Act. Director Chief Administrator

Mrs. M. MRUTU	Institution of Adult Education Regional Center Dept. Acting Head
Mrs. A. NDUALIO	Ins/Adult Education Head, Dept. Distance Education
Mrs. L. MLAZI	Ins/Adult Education Editor, Dept. Correspondence
Mr. B. M. NGWAWASYA	Ins/Adult Education Act. Head Dept. Mass Education
Mrs. P.S. SAJARI	Ins/Adult Education Act. Head Dept. Training & Library Service
Mrs. H. KYARUZI	Ins/Adult Education Printing Manger
Mr. N. M. MWITA	M/Education & Culture Principal Dar es Salaam Teacher's College
Mr. M. CHAHYA J.	M/Education Head, CHANGOMBE Primary School
Mr. J. ANANIA	M/Education Coordinator, KIBASILA Evening Secondary School
Mr. K. KARUMUNA	M/Education Ass. Coordi., KIBASILA Evening Second School

Ministry of Women & Children, Community Division

Mr. KAMAGENGE	Ministry of Women & Children Community Division Acting Director
Mr. SANGANA	Ministry of Women & Children Community Division Acting Director

Ministry of Lobar & Youth, Youth Division

Mrs. Joyce SHAIIDI	Ministry of Labor & Youth Head, Youth Division
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Ministry of Agriculture and Cooperatives

Mr. M. MTWEVE	Ministry of Agriculture in charge Extension Services
Mr. H.L. NYANGI	M/Agriculture Head, Farmers Education & Publicity Unit

Ministry of Health, Health Education Division

Dr. Geoffrey S. KIANGI	Ministry of Health Head, Health Education Division
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Ministry of Science, Technology & Higher Education

Mr. Titus TILTELEKA	Ministry of Science, Technology & Higher Education Director
Mr. M. KOMBA	Ministry of Science, Technology & Higher Education Acting Officer
Mrs. B. MKAYULA	Ministry of Science, Technology & Higher Education Officer
Mr. M. L. LUHANGA	University of Dar-es-Salaam Vice Chancellor Ph. D., Eng.
Mr. A. O. AGU	UNICEF Head, Education & Child Development



Embassy of Japan

Mr. Keitaro SATO

Ambassador Extraordinary and Plenipotentiary

Mr. Kenji YOSHIOKA

First Secretary

Mr. Masashi KONO

First Secretary

Mr. Asahiko TAMINATO

Second Secretary

JICA Tanzania Office

Mr. Shinya NAKAI

JICA Tanzania Office Resident Representative

Mr. Kaoru SUZUKI

JICA Tanzania Office Assistant Resident Representative

Mr. Jackson M. BISWARO

JICA Tanzania Office JICA Chief Program Officer

#### **4. Minutes of Discussions**

- (1) Basic Design Study (Oct. 22, 1999)
- (2) Basic Design Study (Nov. 19, 1999)
- (3) Explanation of Draft Basic Design Study (Mar. 29, 2000)

#### 4. Minutes of Discussion

##### (1) Basic Design Study (Oct. 22, 1999)

MINUTES OF DISCUSSIONS  
ON THE BASIC DESIGN STUDY  
ON THE PROJECT FOR STRENGTHENING THE RADIO BROADCASTING  
FOR SCHOOL EDUCATION BY IMPROVING THE QUALITY OF EDUCATION  
AND PROMOTION OF EQUAL ACCESS TO EDUCATION  
IN THE UNITED REPUBLIC OF TANZANIA

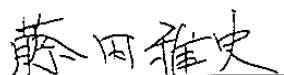
In response to a request from the Government of United Republic of Tanzania, the Government of Japan decided to conduct a basic design study on the Project for Strengthening the Radio Broadcasting for School Education by Improving the Quality of Education and Promotion of Equal Access to Education (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA dispatched to Tanzania the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Masashi Fujita, Director, First Project Management Division, Grant Aid Management Department, JICA, and is scheduled to stay in the country from October 17 to October 22, 1999.

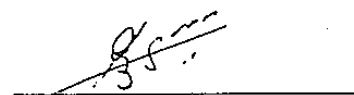
The Team had a series of discussions with concerned officials of the Government of Tanzania and conducted a field survey in the Project area.

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

Dar es Salaam, October 22, 1999

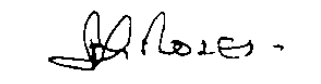


Mr. Masashi Fujita  
Leader,  
Basic Design Study Team,  
JICA



---

Mr. Abdul Ngarawa  
Director of Broadcasting,  
Radio Tanzania Dar es Salaam



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Dr. Ben Moses  
Permanent Secretary,  
Office of the Prime Minister,  
Tanzania

B2



# ATTACHMENT

## 1. Objective

The objective of the Project is to improve the education and dissemination of information on issues such as public health and agriculture in Tanzania through strengthening the radio broadcasting.

## 2. Grant Aid Project area

The project site is located in Radio Tanzania Dar es Salaam (hereinafter referred to as "RTD") Headquarters and Kunduchi Transmitting Station (hereinafter referred to as "the Station").

## 3. Responsible and Executing Agency

The responsible Agency of the Project is the Office of the Prime Minister.  
The executing Agency of the Project is RTD.

## 4. Items Requested by the Government of Tanzania

After discussions with the Team, the items as described below were finally requested by the Tanzanian side.

### (1) Radio Tanzania Dar es Salaam Headquarters

Equipment for Master Control Room, Studio One, Studio Three, Studio Blue, Studio Yellow, Studio Red

### (2) Kunduchi Transmitting Station

Facility for one Transmitting House, one Transmitting Antenna  
Equipment for Transmitter

### (3) Equipment for Common Use

JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

## 5. Japan's Grant Aid System

(1) Government of Tanzania has understood the system of Japan's Grant Aid Scheme explained by the Team, as described in ANNEX-I.

(2) Government of Tanzania will take necessary measures, described in ANNEX-II for smooth implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.



1



## 6. Schedule of the Basic Design Study

- (1) JICA will dispatch the second field survey team at the beginning of November, 1999 in order to proceed with further studies.
- (2) Based upon the second field survey, JICA will prepare the draft report in English and dispatch a mission to Tanzania in order to explain its contents at the end of February, 2000.
- (3) If the contents of the report are accepted in principle by the Government of Tanzania, JICA will complete the final report and send it to the Government of Tanzania by June, 2000.

## 7. Other Relevant Issues

- (1) Both sides agreed that further technical study should be carried out to determine if reconstruction of Transmitting Antenna in the Station is indispensable. In case the reconstruction is necessary, the Tanzanian side shall bear all the costs of dismantlement of the two existing antennas.
- (2) RTD agreed to broadcast radio programs for introduction of Japanese technical and grant aid cooperation, etc. in Tanzania.
- (3) For the sake of the technology transfer on sustainable operation and maintenance, the Tanzanian side pointed out the need for dispatch of Japanese experts as well as technical training of counterpart personnel in Japan. They also understood that another official request on technical cooperation should be submitted through diplomatic channels such as the Embassy of Japan and/or the JICA Office.
- (4) RTD has agreed to provide a necessary number of counterpart personnel on a full-time basis to the second field survey team during its stay in Tanzania.
- (5) RTD has agreed to review and propose priority list of the requested equipment which should be ready at the time of arrival of second field survey team in early November, 1999.

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## Japan's Grant Aid Program

### 1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid is executed by the following procedures.

- **Application** (request made by a recipient country)
- **Study** (Preparatory Study / Basic Design Study conducted by JICA)
- **Appraisal & Approval** (Appraisal by the Government of Japan and Approval by the Cabinet of Japan)
- **Determination of Implementation** (Exchange of Notes between the Governments of Japan and the recipient country)
- **Implementation** (Implementation of the Project)

(2) Firstly, an application or a request for a Project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is suitable for Japan's Grant Aid. If the request is deemed appropriate, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the study (Basic Design Study), using a Japanese consulting firm(s). If the background and objective of the requested project are not clear, a Preparatory Study is conducted prior to a Basic Design Study.

Thirdly, the Government of Japan appraises the project to see whether or not the Project is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA and the results are then submitted for approval by the Cabinet.

Fourthly, the Project approved by the Cabinet becomes official when pledges by the Exchange of Notes signed by the both Governments.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

## 2. Basic Design Study

### (1) Contents of the Study

The purpose of the Study (Preparatory Study/Basic Design Study) conducted on a project requested by JICA is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

- (a) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation;
- (b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view;
- (c) to confirm items agreed on by both parties concerning the basic concept of the Project;
- (d) to prepare a basic design of the project,
- (e) to estimate cost involved in the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the project. Therefore, the implementation of the project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

### (2) Selecting (a) Consulting Firm(s)

For smooth implementation of the study, JICA uses (a) consulting firm(s) registered. JICA selects (a) firm(s) through proposals submitted by firms which are interested. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference made by JICA.

The consulting firm(s) used for the study is(are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency.

### 3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid provides a recipient country with non-reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation as such.

(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant Aid" means Japanese single fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed. However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of single fiscal year at most by mutual agreement between the two Governments.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country origin.

However the prime contractors, namely, consulting, construction and procurement firms, are limited to "Japanese nationals". ( The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons. )



iii

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(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings required to the Government of the recipient country

In the implementation of the Grant Aid, the recipient country is required to undertake necessary measures such as the following:

- (a) to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,
- (b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,
- (c) to secure buildings prior to the installation work in case the Project is providing equipment,
- (d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,
- (e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,
- (f) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.



iv

CBZ



(7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne by the Grant Aid.

(8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

- (a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank" ). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the contracts verified.
- (b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

*BR*

~~*[Signature]*~~  
v

*[Signature]*

## Major Undertakings to be taken by Each Government

## ANNEX-II

NO	Items	To be covered by Grant Aid	To be covered by Recipient side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot	●	
5	To construct roads		
	1) Within the site	●	
	2) Outside the site		●
6	To construct the building	●	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		●
	b. The drop wiring and internal wiring within the site	●	
	c. The main circuit breaker and transformer	●	
	2) Water Supply		
	a. The city water distribution main to the site		●
	b. The supply system within the site ( receiving and/or elevated tanks )	●	
	3) Drainage		
	a. The city drainage main ( for storm, sewer and others ) to the site		●
	b. The drainage system ( for toilet sewer, ordinary waste, storm drainage and others ) within the site	●	
	4) Gas Supply		
	a. The city gas main to the site		●
	b. The gas supply system within the site	●	
	5) Telephone System		
	a. The telephone trunk line to the main distribution frame / panel (MDF) of the building		●
	b. The MDF and the extension after the frame / panel	●	
	6) Furniture and Equipment		
	a. General furniture		●
	b. Project equipment	●	
8	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site		●

BN

10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
13	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for construction of the facilities as well as for the transportation and installation of the equipment		●

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SR

(2) Basic Design Study (Nov. 19, 1999)

**MINUTES OF DISCUSSIONS  
ON THE BASIC DESIGN STUDY  
ON THE PROJECT FOR STRENGTHENING THE RADIO BROADCASTING  
FOR SCHOOL EDUCATION BY IMPROVING THE QUALITY OF EDUCATION  
AND PROMOTION OF EQUAL ACCESS TO EDUCATION  
IN THE UNITED REPUBLIC OF TANZANIA**

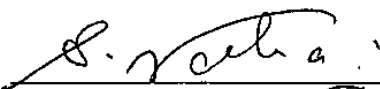
Based on the result of the previous basic design study, the Government of Japan decided to conduct a Basic Design Study on the Project for Strengthening the Radio Broadcasting for School Education by Improving the Quality of Education and Promotion of Equal Access to Education ( hereinafter referred to as "the Project" ) and entrusted the study to the Japan International Cooperation Agency ( JICA ).

JICA sent to the United Republic of Tanzania ( hereinafter referred to as "Tanzania" ) the Basic Design Study Team ( hereinafter referred to as "the Team" ), which is headed by Mr. Shinya Nakai, Resident Representative, JICA Tanzania Office, JICA, and is scheduled to stay in the country from November 9 to December 9, 1999.

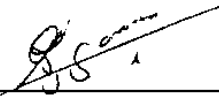
The Team held discussions with the officials concerned of the Government of Tanzania and concluded a field survey in the study area.

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

Dar es Salaam, November 19, 1999



Mr. Shinya Nakai  
Leader,  
Basic Design Study Team,  
JICA



Mr. Abdul Ngarawa  
Director of Broadcasting,  
Radio Tanzania Dar es Salaam



Dr. Ben Moses  
Permanent Secretary,  
Office of the Prime Minister,  
Tanzania

BT.



## ATTACHMENT

### 1. Objective

The objective of the Project is to improve the education and dissemination of information on issues such as public health and agriculture in Tanzania through strengthening the Radio Broadcasting.

### 2. Grant Aid Project area

The project site is located in Radio Tanzania Dar es Salaam (hereinafter referred to as "RTD") Headquarters and Kunduchi Transmitting Station ( hereinafter referred to as "the Station" ).

The Project sites are shown in ANNEX-I.

### 3. Responsible and Executing Agency

The responsible Agency of the Project is the Office of the Prime Minister.

The executing Agency of the Project is RTD.

### 4. Items Requested by the Government of Tanzania

After discussion with the Team, the items as described in ANNEX-II were finally requested by the Tanzanian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

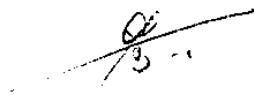
### 5. Japan's Grant Aid System

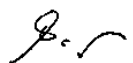
Tanzanian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Tanzania as explained by the Team and described in ANNEX-I and ANNEX-II of the Minutes of Discussions signed by both parties on October 22, 1999.

### 6. Schedule of the Basic Design Study

- (1) The consultants will proceed to further studies in Tanzania until December 9, 1999.
- (2) JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around the end of February, 2000.
- (3) In case that the contents of the report are accepted in principle by the Government of Tanzania, JICA will complete the final report and sent it to the Government of Tanzania by June, 2000.

BR





## 7. Other Relevant Issues

### 1) Kunduchi Transmitting Station

RTD requested the new construction of a building for the Kunduchi transmitting station for the reason that the safety of the existing building can not be maintained any more.

The new construction for the Kunduchi Transmitting Station was recognized as the necessity for the completion of the Project, as a survey result of the station building. The Team acknowledged the problem mentioned above. However what to be included as the project components will be finally identified as output of the Study.

### 2) Existing Directional Antenna

RTD requested the reconstruction of a directional antenna for the 100kw medium wave transmitter in Kunduchi Transmitting Station, because there is a danger that it might collapse.

As a result of the survey, the Team also confirmed that there is a danger for the directional antenna to collapse.

The above judgment were done because of the rots found at every joint part of the base insulators.

The Team acknowledged the problem mentioned above. However what to be included as the project components will be finally identified as output of the Study.

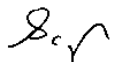
### 3) RTD Studio Centre at Dar es Salaam

RTD requested to reconstruct the broadcasting centre building.

The team in their survey, established that there is rain water leakage at the area around the studio therefore it is clear that some countermeasures are necessary for the preservation of the broadcasting equipment.

The Team acknowledged the problem mentioned above. However what to be included as the project components will be finally identified as output of the Study.

BR







ANNEX-II

**Items Requested by the Government of Tanzania**

1. Transmitter Equipment  
Comprising of
  - 100KW MF Radio Transmitter 1set
  - Transmitter Cooling Equipment 1set
  - Program Input / Monitoring Equipment 1set
  - Transmitter Control Equipment 1set
  - 100KW Air Cooled Dummy Load 1set
2. Power Supply Unit  
Comprising of
  - Engine Generator System 1set  
including fuel tank
  - Power Distribution Board 1set
  - Automatic Change-over Panel 1set
  - Automatic Voltage Regulator 1set
- @ 3. Directional Transmission Antenna System 1lot  
including Line Feeder System
4. Construction of Transmitting Station 1lot  
including ancillary building equipment
5. Program Production Studio  
Comprising of
  - 1) Program Production Equipment  
Comprising of
    - Studio-1 1set
    - Studio-3 1set
    - Studio-Blue 1set
    - Studio-Red 1set
    - Studio-Yellow 1set
    - MCR 1set
  - @ 2) Reconstruction of Studio Centre Building 1lot
6. Common Equipment  
Comprising of
  - Measuring Equipment 1lot
  - Spares 1lot

Note: The items added newly marked with @

Bn.





- (3) Explanation of Draft Basic Design Study (Mar. 29, 2000)

**MINUTES OF DISCUSSIONS**  
**ON THE BASIC DESIGN STUDY**  
**ON THE PROJECT FOR STRENGTHENING THE RADIO BROADCASTING**  
**FOR SCHOOL EDUCATION BY IMPROVING THE QUALITY OF EDUCATION**  
**AND PROMOTION OF EQUAL ACCESS TO EDUCATION**  
**IN THE UNITED REPUBLIC OF TANZANIA**

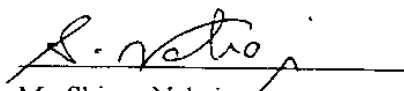
**(EXPLANATION ON DRAFT REPORT)**

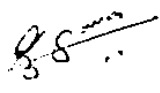
In October and November 1999, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched Basic Design Study Teams on the Project for Strengthening the Radio Broadcasting for School Education by Improving the Quality of Education and Promotion of Equal Access to Education (hereinafter referred to as "the Project"), to the United Republic of Tanzania (hereinafter referred to as "Tanzania"), and through discussion, field survey and technical examination of the results in Japan, JICA prepared a draft report of the Study.


In order to explain and to consult the Tanzania on the components of the draft report, JICA sent to Tanzania the Draft Report Explanation Team (hereinafter referred to as "the Team") which is headed by Mr. Shinya Nakai, Resident Representative, JICA Tanzania Office March 21 to March 30, 2000.

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

Dar es Salaam March 29, 2000.

  
Mr. Shinya Nakai  
Leader,  
Draft Report Explanation Team,  
JICA

  
Mr. Abdul Ngarawa  
Director of Broadcasting,  
Radio Tanzania Dar es Salaam

  
Mr. Raphael O. S. Molliel  
Permanent Secretary,  
Prime Minister's Office,  
Tanzania

## ATTACHMENT

### 1. Components of the Draft Report

The Government of Tanzania agreed and accepted in principle the components of the draft report explained by the Team.

### 2. Japan's Grant Aid Scheme

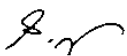
Tanzania side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Tanzania as explained by the Team and described in ANNEX-I and ANNEX-II of the Minutes of Discussions signed by both parties on October 22, 1999.

### 3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Tanzania by June, 2000.

### 4. Other Relevant Issues

- (1) Tanzania side shall ensure enough budget and personnel to operate and maintain the facilities and equipment after the completion of the Project.
- (2) Before the commencement of the Consultation of the facilities by the Project, Tanzania side agreed to complete the work stipulated below by its own budget.
  - 1) Removal of the existing boundary walls at south side of the RTD Studio Centre, adjoining the construction site
  - 2) Construction of a connecting corridor between the existing buildings and the new building
  - 3) Construction of fences around the construction site for the building and a guard house
  - 4) Removal of (2) existing Antenna, existing Feeder Run and ATU Hut at Kunduchi transmitting station
  - 5) Securing construction sites for RTD New Studio Block and Kunduchi Transmitting Station Building



- 6) Removal or relocation of obstacles that hinder the construction in both sites  
Works worthy of special mention are as follows:
- Construction site for RTD New Studio Block: shifting the existing power line that runs in parallel to the fences on the south side of the existing facility
  - Construction site for Kunduchi Transmitting Station Building: shifting the existing power and telephone lines that run in parallel along the approach road to the existing station building
- 7) Preparation of access road to the required location at both sites (if necessary)
  - 8) Supply and connection of commercial power to the required points in the buildings
  - 9) Connection of water supply to the required location at both sites
  - 10) Construction of new boundary walls and a gate around the site for RTD New Studio Block
  - 11) Preparation of the facilities in the new buildings, such as telephone, furniture, utensils, gardening, etc. if necessary
  - 12) Securing of construction and stockyard spaces necessary for construction of buildings and for installation of the equipment
  - 13) Relocation of existing equipment to be used for RTD New Studio Block (transmitter, transmitting antenna, medium wave/short wave/FM receives, radio communication facility etc.)
  - 14) Installation and wiring work of equipment installed inside the existing buildings (interphones, sub clocks, wall mounted speakers, etc.)
  - 15) Acquisition of all legal permits and approvals required in Tanzania for implementation of the Project
  - 16) Tax exemption for imported construction materials and broadcasting equipment for the Project
  - 17) Appropriate and efficient maintenance and management of the buildings and equipment to be granted to Tanzania

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## 5. Cost Estimation Bone the Recipient Country

(1) Kunduchi Transmitting Station (130,000 K Tsh)

### Items

- |   |         |
|---|---------|
| 1) Construction of fences around the construction site for the building and a guard house   | 6,000   |
| 2) Removal of (2) existing antenna at Kunduchi transmitting station   | 114,000 |
| 3) Securing construction sites for Kunduchi Transmitting Building   | 0       |
| 4) Shifting the existing power and telephone lines that run in parallel along the approach road to the existing Transmitting building | 10,000  |

(2) RTD New Studio Block (32,000 K Tsh)

### Items

- |  |        |
|--|--------|
| 1) Removal of the existing boundary walls at south side of the RTD Broadcasting Centre, adjoining the construction site  | 3,000  |
| 2) Construction of a connecting corridor between the existing buildings and the new building   | 5,000  |
| 3) Security construction site for RTD New Studio Block   | 0      |
| 4) Shifting the existing power line that runs in parallel to the fences on the south side of the existing facility   | 3,000  |
| 5) Construction of new boundary walls and a gate around the site for RTD New Studio Block  | 20,000 |
| 6) Relocation of existing equipment to be used for RTD New Studio Block (transmitter, transmitting antenna, medium wave/short wave/FM receives, radio communication facility etc.) | 1,000  |
| 7) Installation and wiring work of equipment installed inside the existing buildings (interphones, sub clocks, wall mounted speakers, etc.)  | 0      |

(3) Common (19,500 K Tsh)

### Items

- |  |        |
|--|--------|
| 1) Preparation of access road to the required location at both sites (if necessary)  | 2,500  |
| 2) Supply and connection of commercial power to the required points in the buildings   | 10,000 |
| 3) Connection of water supply to the required location at both sites   | 1,500  |
| 4) Preparation of the facilities in the new buildings, such as telephone, furniture, utensils, gardening, etc. if necessary    | 4,000  |
| 5) Securing of construction and stockyard spaces necessary for construction of buildings and for installation of the equipment | 1,500  |

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Total 181,500 K Tsh

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