The microwave link (STL), which sends TV programmes from Nakasero Headquarters to Kololo station, the programme input and monitoring equipment (made in 1972) etc., are all superannuated, and fluctuation of input signal level, degradation of picture quality (white dotted noise) and instability are observed. The renewal of all facilities are of great necessity.

(6) Transmitting Antenna

At first, V-type, 14-stack simplified antenna were mounted. For expansion of service area, UTV tried to replace it with 4-dipole, 4-panel antennas of 4-stack, but the work was stopped due to the lack of load capacity of the tower. At present, the service area is limited to Kampala city and its suburbs with 4-panel, 1-stack antenna, and rebroadcasting by the off-air relay at Mbale station is impossible.

In order to improve service, it is necessary to construct a new self-supporting square tower with a new antenna.

2-7-3 Soroti Transmitting Station

The station receives TV signal radiated from Mbale station by off-air relay and covers Soroti and Kumi districts.

(1) Location

It is located about 4 km far from Soroti city, long. 33° 39' 03" E, lat. 01° 42' and 1,200 m high above sea level. This site is good for propagation of TV signal, because it is surrounded with wide and flat land.

(2) Housing

It is a one-storied house of 230 m^2. No damage is seen on the house and neatly cleaned inside. In this project, the removal of old facilities which installed in 1965, and some arrangement are necessary. As the housing is good, it can be used as it is. There are some private houses.

(3) Transmitting Tower

A guyed tower of 150 m high is built 3.5 m away from the housing. On the top guy wire, obstruction balls are mounted for aviation alarm, because a flying school is nearby.

The load capacity of the existing tower is at the limit for the existing antenna. When antenna is renewed by the project, the tower should be also reconstructed for ensuring the load capacity. The site is wide enough, and a guyed tower can be constructed.

(4) Road

It faces on the paved trunk road from Mbale to Soroti, and all including access road, are kept in good condition.

(5) Transmitting Facilities

The station is situated on the flat suburb area. It has two transmitters, one is made of Marconi in 1965, the other of Toshiba Corp. in 1975. The former is out of use, because the parts were taken off. One of the units, VSBF of Toshiba, is out of order. And Marconi-made filterplexer is used.

UTV has conducted the test transmission and confirmed its operation. However, the renewal is considered to be necessary, considering old age and difficulties on the procurement of spare parts.

Antenna is a V-type, 14-stack, and its directivity is questionable. Without the dehydrator, water comes into main feeder and degrades the VSWR value.

It is necessary to replace the antenna with four-dipole antennas and to reconstruct the tower, because the existing tower has not enough load capacity for a new antenna.

A corner of housing was designed for studio, it will be used after the necessary remodelling such as repair of floor and wall, sound insulation of ceiling, furnishings of studio, mounting of sound insulation material, electrical shielding, air condition etc.

2-7-4 Lira Transmitting Station

It covers Lira and Apac districts and rebroadcasts the programme received from Soroti station.

(1) Location

It is located about 2 km west from Lira city, long. 32° 52' 19 E, lat. 02° 16' 00 N, 1,080 m high above sea level. Surroundings are flat and like Soroti.

(2) Housing

Same repairing as Soroti station are needed.

(3) Transmitting Tower

It is the same design of as Soroti. The directivity of the existing V-type, 12-stack antenna, is questionable. Without dehydrator, water comes into main feeder, and VSWR value becomes high. If antenna is replaced with four-dipole antenna, the tower should be also renewed because of load capacity.

(4) Road

It faces on the trunk road from Lira to Gulu via Kamdini. The condition is very well, and the access road is kept also in good condition. However, the span between Soroti and lira is not paved.

(5) Transmitter

The transmitter was made by Marconi in 1965. It is out of use due to missing and loss of units and antiquity. A plan is under way to install a 5 kW-transmitter by own budget.

2-7-5 Masaka Transmitting Station

The coverage is the eastern parts of Masaka District. Programme is sent from Kampala by microwave link of Uganda P&T.

Housing, transmitter, auxiliary equipment, tower, antenna etc., are planned to be renewed by own budget.

(1) Location

The station is located in a flat area 1 km south from the city centre of Masaka, long. 31° 44' 51 E, lat. 00° 21' 35" S, 1,330 m high above sea level.

(2) Housing

It was a one-storied brick-laid house, of the same design as Soroti and Lira, and completely destroyed by revolution war, leaving only a part of wall.

(3) Road

As the station is near the downtown, the road is good.

(4) Transmitting Facilities

It is located on the flat area in the suburbs of Masaka city. In revolution war, housing and facilities were completely destroyed, and transmitting facilities were razed to the ground. Antenna was all removed, and some of guy wires were cut. Renewal of housing, transmitting facilities, antenna, tower etc., are planned by Japanese DRG and own budget.

The programme is sent from Kampala by microwave link of Uganda P&T. As the link has only two channels, programme possibly could not be relayed in emergency, because the telephone has priority.

In order to provide the countermeasure, it is necessary to install the off-air relay receiver, which receives the signal radiated from Kololo transmitting station (Kampala).

2-7-6 Mbarara Transmitting Station

It covers the southern part of Mbarara District. The programme is sent through microwave link operated by Uganda P&T, like Masaka station. In this station also, the renewal of transmitter, auxiliary equipment, tower and antenna is planned by Japanese DRG and own budget.

(1) Location

It is situated on the mountain top, about 20 km south-west from Mbarara city, long. 30^{o} 33' 24" R, 00^{o} 43' 21" S, 1,860 m high above sea level.

(2) Housing

It is built on the eastern slope of the ridge, and consist of transmitter house with floor area of 48 m^2, and power generator house, 14 m^2. As these two houses have a little damage, there is no problem in usage.

(3) Road

Although the road is not paved, it is good except some bumpy parts.

(4) Transmitter

It is located on the top of mountain, south of Mbarara city. Transmitter is of Marconi made in 1968 and is out of use, because the parts were taken off. Antenna is a V-type, 12-stack, and main feeder is cut off.

Renewal of transmitter, tower, antenna etc., is planned by Japanese DRG and own budget. Like Masaka station, the off-air relay receiver is necessary for standby of programme relay.

As the preset area of studio construction by the grant aid project is situated several hundred metres from the relay station of Uganda P&T, the reception of programme is easily possible.

2-7-7 Mbale Transmitting Station

Mbale station receives directly the on-air signal of Kololo station, and retransmits it, i.e. the off-air relay system. As the distance between the two stations, however, reaches 200 km, fluctuation of field strength (fading) and others occurs in the wave propagation. In order to minimize these effects, the receiving antenna adopts a corner reflector of 24-panel. The antenna works well, but the booster connected

with it, is out of order. At present the received picture quality is not practicable.

Transmitter is of Marconi made in 1965, and it does not work due to failure. The filterplexer is of black & white type.

The renewal of booster amplifier, transmitting facilities, antenna, tower etc., is planned by Japanese DRG and own budget.

The location is on the mountain top, about 15 km from downtown. The access road is bad and becomes slippery and dangerous in the rainy day.

2-7-8 Gulu Transmitting Station

It is located on the mountain top, about 25 km south-east from the city.

A 5 kW-transmitter of Toshiba is installed, but test transmission has never been made. Rust and stain are much. The transmitter is of no use as it is.

Although UTV has been planning to repair it and conduct transmission test, it is worried that the impairment of parts cause the trouble for recovering its function.

In order to make test transmission a success, it is necessary to clean the whole electronic equipment, dry of high tension parts, check and replacement of deteriorated parts etc.

Antenna is a two dipole type, with 4 stacks for north-east, and 2 stacks for both north-west and south-west. The outside appearance of antenna and tower is good.

UTV has prepared three expected sites for studio construction which is expected in the project by grant aid. Among them, the western part of ground, faced on the road, spread between a golf club and the regional office, in the north of Gulu is most preferable.

2-7-9 Masindi Transmitting Station

The remodelling of this station was planned in '70, but suspended by revolution war At present, only housing is left and there is no facility. It is located on the hill top far from the city. In some portion of the access road, it is difficult to pass, where only a 4-wheel-drive vehicle can pass through, and some repairing is needed. The relay station of Uganda P&T is about 40 m from it, and the power lines of single-phase, two-lined (240 V) are available.

2-7-10 Kabale Transmitting Station

It is on the top of mountain, south of Kabale city. The 500 W-transposer is of Toshiba made in 1973. As it is left abandoned for a long time, it is covered with rust and stain. It is decided that the facilities could not be used as they are, same as Gulu station. Before the usage, the deliberate parts check, cleaning etc., are needed. Antenna is a two-dipole, 2-panel, 2-stack, of which appearance is good.

The receiving antenna of the off-air relay is a Yagi antenna array of 8-element, 2-panel (space diversity system), of which antenna cable is cut.

2-7-11 Jinja Transmitting Station

It is located on the top of the hill in the suburbs of the city. This station receives the TV signal from Kololo transmitting station (Kampala) and rebroadcast it to Jinja area by 5 W transposer.

It is proposed to increase transmitter power of the station for expansion of its service area. However, it will be decided by the result of field strength measurement after the rehabilitation of Kololo transmitting station.

2-7-12 Programme Relay station

(North-east Route)

(1) Kampala-Jinja-Kagulu-Soroti Route

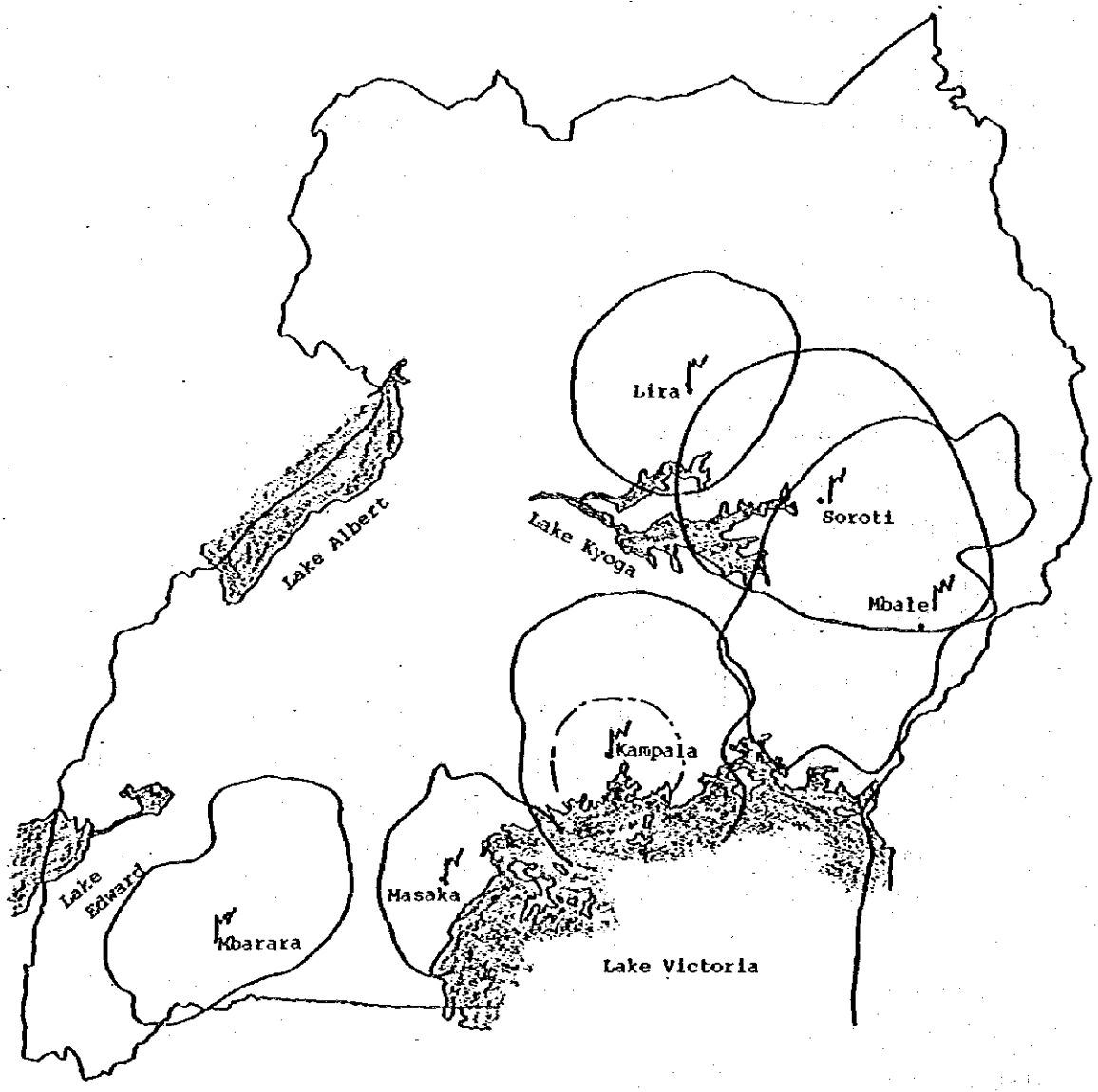
Jinja station has a transmitter which covers Jinja area, and provides with a programme relay equipment. The latter receives the VHF signal of Kololo station, and transmits to Kagulu relay station after converting to channel 61 at UHF band. From there, it was relayed to Soroti station with channel 65. Kagulu relay station was installed on the top of steep rock mountain, all equipment were carried by the helicopter. The engine-generator was installed at the foot. At present, generator, antenna etc., were removed. Mountain climbing is difficult, and it is far from the nearest station. As the road condition is not good, periodical maintenance is also very difficult.

(2) Soroti-Ongola-Lira Route

Ongola relay station received the signal of Soroti station, and transmitted to Lira station, after converting to channel 61 at UHF. Ongola station was installed also on the top of rocky hill, and the access road reaches 200 m before the housing. In the housing and transmitter, many carcasses of the lady birds are left, some of the connecting cables between units are cut out.

The above programme relay stations will lose their functions, as direct off-air relay becomes possible after the improvement of the related transmitting station and the opening of UP&T microwave links to the north (Soroti, Lira, Guru) via the east (Mbale) up to 1988.

Fig. 2-1 The Coverage of Uganda Television



——— The Latter '60s (65% of Total Population)

— - — Present Condition (May, 1985 8% of Total Population)

Fig. 2-2 Present Condition of Uganda TV Network

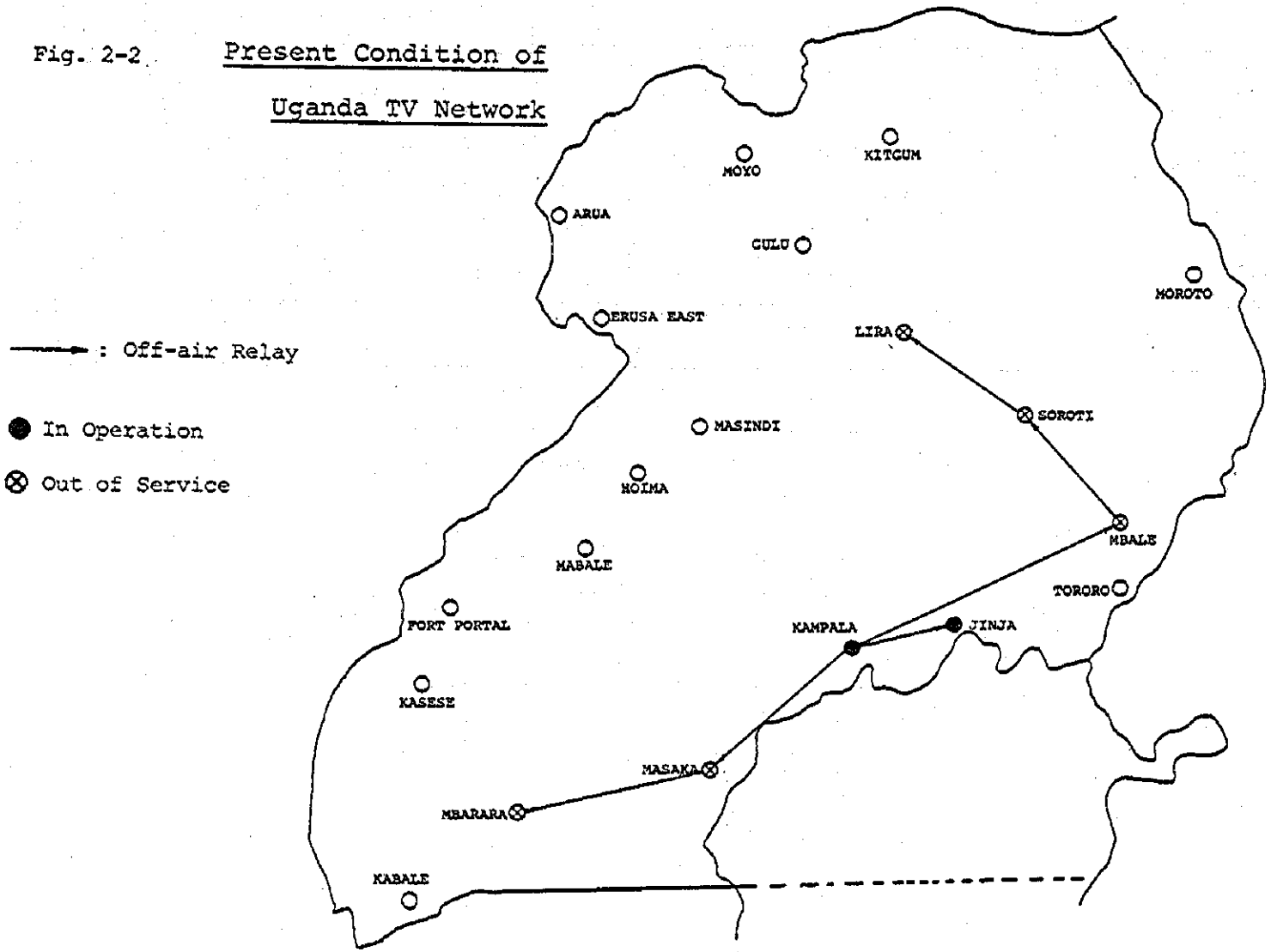
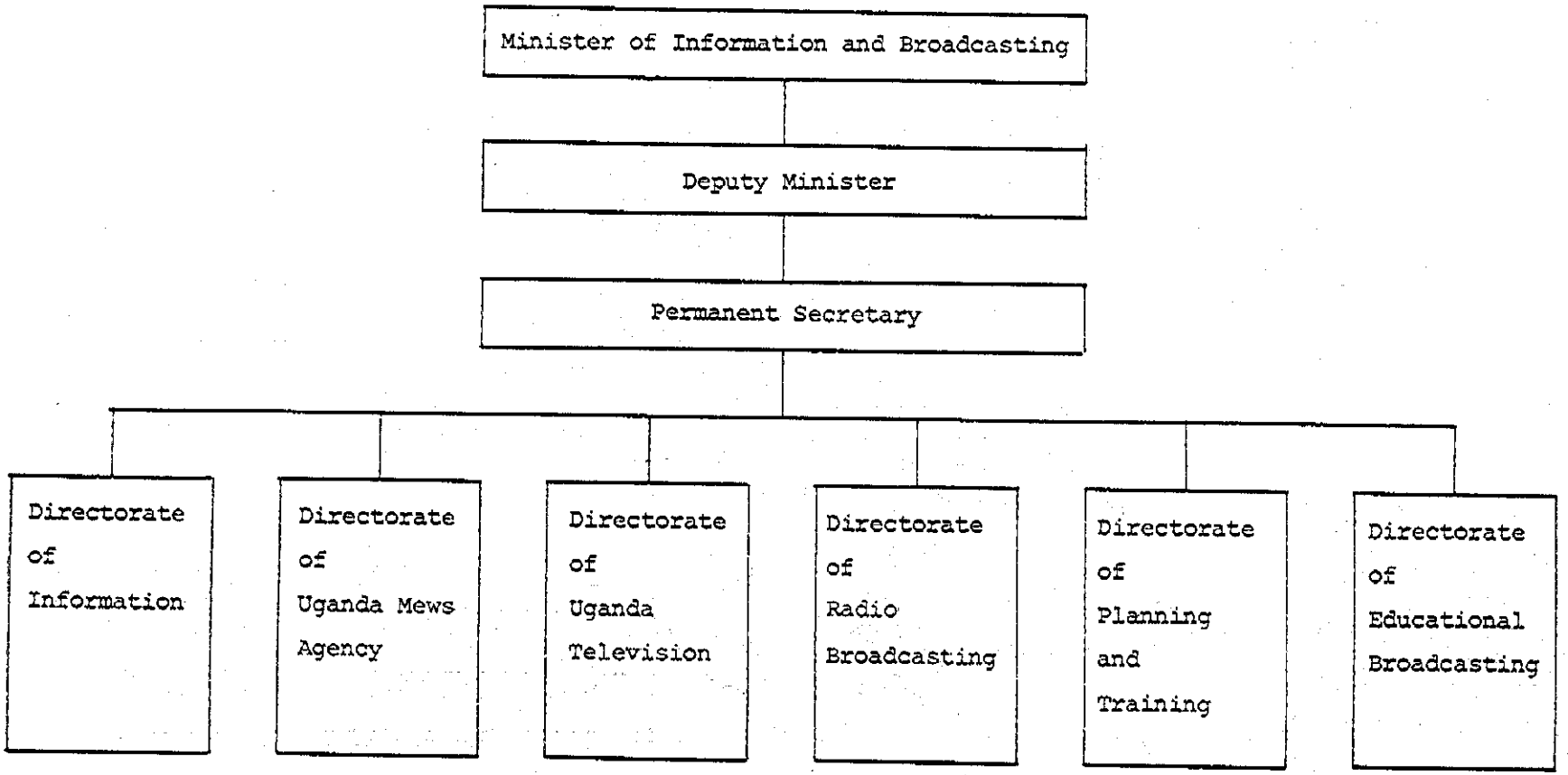


Table 2-1

Organization Chart of Ministry of Information and Broadcasting



CHAPTER 3. CONTENTS OF THE PROJECT

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3-1 Object of the Project

Television broadcasting in Uganda was started in October 1963. Since then, UTV constructed transmitting stations successively in Kampala (Kololo) and other major cities; Western area (Masaka and Mbarara) and North-eastern area (Mbale, Soroti and Lira). As a result, by the second half of the 1960s, TV broadcasting was expanded to cover up to 65% of the total population. However, due to damages caused by the revolution war in the 1970s, antiquated facilities and shortage of spare parts, the present TV coverage is limited to Kampala city and its suburbs as well as Jinja city, which represents merely some 8% of the population coverage.

The proposed rehabilitation project, together with the on-going programme with Japanese DRG and Uganda's own fund, aims:

(1) To restore the population coverage to an earlier level of 65% from a present meager 8%, while ensuring a good-quality and reliable TV broadcasting.
Thus, it will make possible a dramatic boost in information dissemination, realize more public awareness of government policies down to the grass-root level, and provide a wider range of public school education and social education.

(2) Coping with the improvement of production capability, provision of more programmes, and preparations for extension of broadcast hours.
Realizing that the strong demand for enriching the educational programmes, including those for schools, as well as ensuring the punctuality and extension of service hours.

3-2 Request of the Ugandan Government

The Ugandan government's requests for grant aid are:

(1) Rehabilitation of Transmitting facilities

1) Install a 10 kW transmitter, and renew 150 m high tower, antenna at Kololo station, to provide improved and expanded transmission service.

2) Install a 5 kW transmitter, and renew 150 m tower, antenna at Soroti station.

3) Renew 150 m tower and antenna at Lira station.

(2) Renovation of Programme Production and Continuity Facilities

Renovate six TV studios located at Kampala, Mbale, Soroti, Lira, Gulu and Mbarara.

(3) Moreover, during the discussion with UTV staff, it was agreed to include additional following items:

1) Install the broadcast off-air relay equipment at Masaka and Mbarara transmitting stations.

2) During the process of implementing this project, the three types of training will be conducted.

a) Factory training (during the manufacturing period of equipment in Japan)

b) Training at construction site in Uganda.

c) Collective training (after completing the rehabilitation project, by gathering all engineers concerned.)

(4) Besides, during the meeting of the explanation on the draft final report of the project held in Uganda, additional requirements were submitted to include the following items.

1) ENG System

At least six sets of ENG system for producing local programmes in the country area.

2) Transport Vehicle

Seven are required, one each for the ENG's and one for Soroti Station.

3) SSB Communication Equipment

Four more sets of SSB are required, one each for Nakasero Headquarters, Lira, Masaka and Mbarara station.

3-3 Basic Concept of TV Network Plan

The survey team has enough recognized through site survey that UTV is now making efforts to rehabilitate the destroyed and antiquated broadcasting facilities by its own fund together with Japanese DRG. The proposed project, together with the Uganda's on-going plan, aims to restore the transmitting facilities and population coverage (65%) at the level of 1960s, by rehabilitating the studio and related facilities at Kampala station, as well as renovating transmitting facilities located in Kololo (Kampala) and other major cities. Simultaneously, the production capability and continuity function will be improved at Kampala station.

In making the basic design, the present conditions of UTV's transmitting, programme production and continuity facilities at Kampala headquarter, as well as transmitting facilities located at other major cities were investigated and analised. The appropriate scale of facilities were then determined to achieve the target as is stated in Chapter 3-1. The result is outlined in Table 3-1.

3-3-1 Rehabilitation of Transmitting Facilities

UTV has a plan to rehabilitate five major transmitting stations (Masaka, Mbarara, Mbale, Soroti and Lira), which are at present out of service due to deterioration, destruction and shortage of spare parts, as well as to rehabilitate Kololo transmitting station which is operating in

precarious state, in order to restore the population coverage of 65% achieved in the 1960s. UTV is implementing part of the rehabilitation plan by its own fund with Japanese DRG.

The rehabilitation plan was determined by the order of priority shown in the master plan. In the cities where five TV stations are located and their rehabilitation works are expected, are district government offices serving as the regional centres in political, economical and social terms and the rehabilitation of those six transmitting stations is considered as justified.

The six transmitting stations, including Kololo station, are all equipped with antiquated facilities. Thus, they appear to be incapable of serving the stable transmission for the long term (1 or 2 years ahead), even if the facilities have been partly renovated by completing the UTV's on-going programme. It is therefore necessary to rehabilitate the whole facilities located at these six stations. By combining with the grant aid project, the total renewal of the six stations will become possible.

The transmitter located at Kololo station will be upgraded to 10 kW from the present 5 kW. The reason is to improve the receiving condition in Kampala city and its suburbs where population is increased, and to increase the field strength at the off-air relay station connected in tandem, together with the increase of antenna gain. (Mbale: 205 km, Masaka: 120 km) From the viewpoint of the crucial importance of the Kololo Station, the transmitter facilities will be of the design of dual system.

The transmitters which will be installed at Soroti and Lira are 5 kW, the same as was used in the 1960s: Incidentally, the transmitting stations under rehabilitation by UTV's on-going project expect the same output power.

This transmitter power is ample enough to cover the respective station area with a radius of 80 km each. It is also capable of providing sufficient field strength for intermediate off-air relay stations (some 150 km distant. Details are set out in the master plan).

As for Masaka and Mbarara transmitting stations, broadcast programme is transmitted from Kampala via Uganda P&T's microwave link. As the microwave link comprises of the two channels (one for telephone and the spare for TV), once the telephone network is out of order, the spare channel is instantly switched over for telephone transmission, thus TV programme cannot be transmitted.

To deal with this problem, off-air relay equipment will be installed at Masaka and Mbarara transmitting stations to receive the TV signal from Kampala and Masaka respectively, thus preventing interruption of programme.

Except for the increase of transmitter power at Kololo station to 10 kW from the present 5 kW, rehabilitation of other five transmitting stations by installing new 5 kW transmitters - the same capacity as was installed during the sixties - but replacing antenna with the new higher efficiency ones, is expected to bring about the population coverage of 70% (about 10 million people) when both of the on-going and grant-aid rehabilitation projects are completed, according to the estimation by the survey mission.

The expected population coverage by these transmitting stations is broken down as follows, with the total population of 14.28 million:

* Kololo station	22.0 %	(3.15 million people)
* Mbale station	9.8 %	(1.40 million people)
* Soroti	14.6 %	(2.09 million people)
* Lira station	5.2 %	(0.74 million people)
* Masaka station	6.7 %	(0.96 million people)
* Mbarara station	11.6 %	(1.66 million people)
Total coverage	70.0 %	(9.99 million people)

Rehabilitation of transmitting stations under the proposed grant aid project is outlined as below:

(1) Kololo transmitting station:

. transmitter and related facilities, tower, antenna and STL, all of which are to be rehabilitated.

(2) Soroti transmitting station:

transmitter and related facilities, tower and antenna are all due for rehabilitation.

(3) Lira transmitting station:

rehabilitation of tower and antenna.

(4) Masaka transmitting station:

installation of off-air relay equipment.

(5) Mbarara transmitting station:

installation of off-air relay equipment.

3-3-2 Rehabilitation of Programme Production and Transmission Facilities

Among three facilities of Studio David, Studio B and Continuity Studio (used also for news studio) in the Kampala headquarters, only the Studio David is barely under operation and function for the present.

Due to the inconvenience caused by decayed and inadequate studio facilities, the contents of school broadcasting, news and general programmes are poor and insufficient. Consequently, production of the programmes are squeezing in small quantities.

Even though richness in the contents of school broadcasting programmes, set-up of regular broadcasting time and the extension of broadcasting-time are specially sought after, all these requirements are unable to be accommodated because of studio shortage.

In regard to general TV programmes, the import and rental of such general programmes, from foreign countries and resident embassies, are necessarily undertaken, in order to supplement general TV programmes produced in small quantities.

Basically to settle down these problems, it is quite requisite to rehabilitate all studios in the Kampala Headquarters. In the rehabilitation plan, a priority should be given to the rehabilitation of the Studio B, so as to be in charge of a production centre for producing all programmes.

After completion of improvement and rehabilitation works concerned with the Studio B, there will become five or six units of TV programme in daily production capacity. At same time, grade-up and higher elevation of the programme quality, setting-up of regular times for the school broadcast and further extension of the broadcasting time, as well as increase of own produced programmes, will be greatly expected.

In the daily production schedule of TV programmes at the Studio B, from 9:00 a.m. up to 20:00 p.m., it will take two hours to produce one unit of TV programme (in 30 minutes broadcasting). Accordingly, five units of TV programme will be possible to be produced per day, at the Studio B.

Out of the five, if programmes are composed of such that three units will be for school educational programme, and the other two units, for general purpose (social, cultural and entertainment), then the production time schedule, for example, will become as follows:-

9:00 a.m. - 11:00 a.m. 11:00 a.m. - 13:00 p.m. 14:00 p.m. - 16:00 p.m.	for producing school educational programmes.
16:00 p.m. - 18:00 p.m. 18:00 p.m. - 20:00 p.m.	for producing general programmes.

(1) Production of School Broadcast Programmes

According to the curriculums of Uganda schools, TV programmes for the school broadcast are to be produced and broadcast in accordance with the contents of lessons carried out at primary, middle and technical schools.

Major courses of TV programmes broadcast in UTV in Uganda will be on language, science and social affairs, which is easily presumed in term of the present and existing programmes, nowadays broadcast in the country.

(2) Production of General Programmes

Main programmes for social culture (promotion and elevation of health and sanitary knowledge, and information and communication as to agricultural matters), and for entertainment (songs, dances, and festival meetings, of different tribes), will be produced and then broadcast.

Special features of the educational and cultural programmes are generally noticed in several times of re-broadcasts of same, with change and re-location of the original broadcasting day and time. When own-made TV programmes are constantly kept in stock (taking six months or almost one year), inclusive of procurement of TV programme units from outside sources, regular broadcasting time (for one hour run in the morning and evening) is to be really materialized.

For this purpose in the rehabilitation plan, following schedules are to be set in:-

1) The Studio B is to be improved and rehabilitated for a centre of TV programme production facilities. As the Studio B is originally designed to be co-ordinated use of OB Van facilities, there is nothing special of any facility and equipment. Accordingly, with except of the buildings, all facilities and equipment will be newly installed.

As the facilities and equipment in the Studio David are insufficient and inadequate, the Studio B will take in a Centre of TV programme production, after its rehabilitation and improvement.

Definite contents of the rehabilitation and improvement plan are as follows:-

a. Three unit system of TV camera is provided. The Studio B is to be equipped with picture and sound equipment, corresponding and complying well with the three units of TV camera.

b. One set of lighting system is to be installed. Size and capacity of the lighting equipment should be good enough to cover up the floor space of the Studio B. Besides, it is proper that such facilities and systems should be of simply handled type.

c. Other equipment and devices, such as sound and video equipment (tape-recorder, disc-player, monitor, intercom. equipment etc.), all these are to be equipped with the Studio B.

2) Also, the Studio B should be provided with a set of air-conditioner which will be able to get rid of heat from the lighting system and other facilities.

3) In main control facilities, some equipment which are entirely decayed will be rehabilitated or newly replaced with new one. At the same time, consideration should be undertaken in coping with future expansion of the Studio.

4) ENG System
ENG system, for producing local programmes in the country area.

5) Rehabilitation of VTR editing equipment, is made to comply with plural number of ENG equipment which will be purchased and installed by Japanese Grant Aid and own fund (One of two ENG sets is operating).

6) Transport Vehicle
One each for the ENG's and one for Soroti Station.

7) SSB Communication Equipment
Four sets of SSBs, one each for Nakasero Headquarters, Lira, Masaka and Mbarara station.

Although it is noticed and pointed out the necessity of producing and broadcasting of local programmes in different tribal languages, however no production studio and crew are provided in UTV's regional station.

For the functioning of one TV studio, it is necessary to have enough time and staff, and is required to be positioned a crew of about 10 personnels after giving professional training.

Under such conditions mentioned in above a priority should be given to the rehabilitation and improvement of the studio located at the capital of Kampala, which is to undertake production of nation-wide TV programmes.

At present, 28 staff are engaging in the TV programme production and it would be possible to comply with programme production and transmission at two studios, Studio David and Studio B, however no surplus staff is disposed to be positioned to each local station.

Training of TV programme production staff, in future to be positioned in the local studios, is possible to execute at the Studio B, which will be newly improved and rehabilitated in the plan of rehabilitation.

After they are well trained at the Studio B, construction of TV studio in each local station shall be conducted so as to make reasonable progress in broadcasting.

For production of local TV programmes, a set of ENG supplied by Japanese Grant Aid may be shifted and transported to each station from Kampala headquarters, but contents of produced programmes will be possibly simple, not sophisticated one.

The rehabilitation plan of UTV network and the expected coverage after completion of the plan and shown in Fig. 3-1, and Fig. 3-2, respectively.

Fig.3-1 Rehabilitation Plan of Uganda TV Network

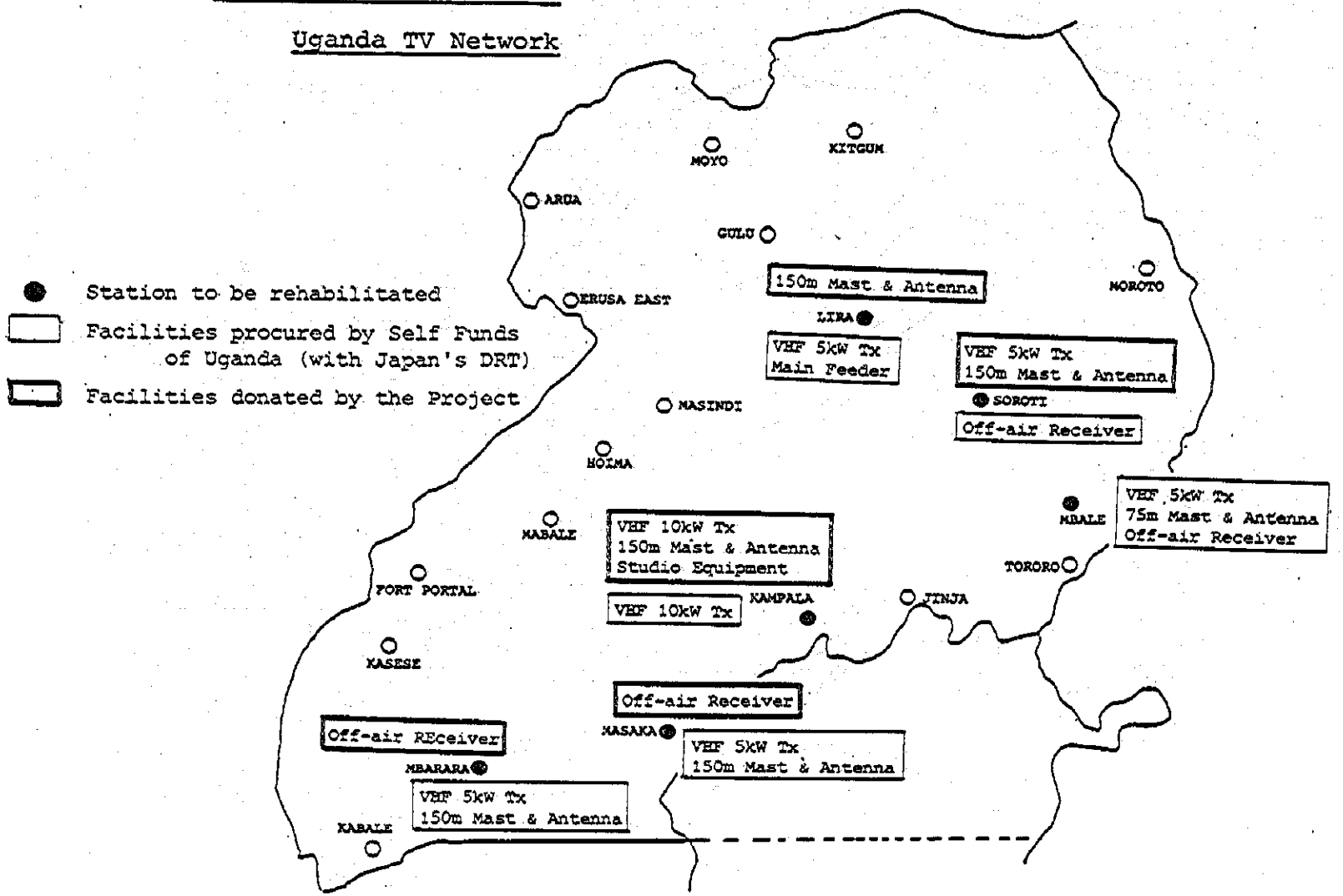
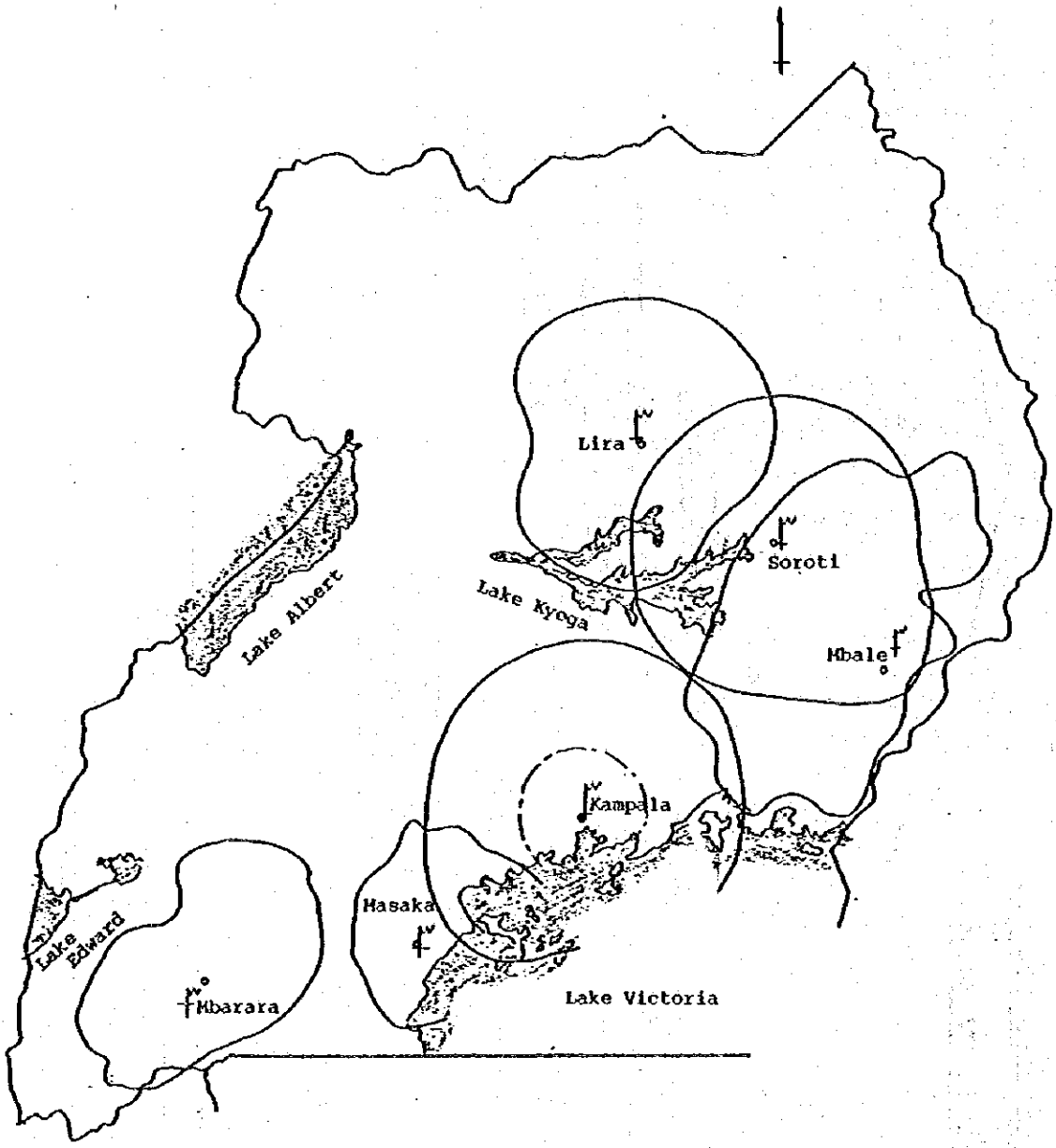


Fig. 3-2 The Coverage of Uganda Television



——— After the Rehabilitation by Self Fund together with Japanese DRG and Japanese Grant Aid (70% of Total Population)

——·—— Present Condition (May, 1985)

Table 3-1 Present Condition of Broadcasting Facilities and Outline of Rehabilitation Plan

	Item	Present Conditon of Facility	Problems in Actual Operation	Rehabilitation by Grant Aid	Expected Improvements
Programme Production & Sending Facilities	Studio David	Two Cameras at Work Barely	Difficulties on Production Difficulties on Regularize of Educational Programme Poor Video & Audio Quality No Attractive Programme		By Augumentation of Own-made Programmes 1) Diffusion & Expansion of Educational & Cultural Programme 2) Full Communication of National Policy & Information 3) Presentation of Entertainment Programme Consequently, strong continuousness of nation & improvement of culture & life will be expected.
	Studio B	Only Wiring for Lighting		One Set of Studio Facility	
	OB Van	One Camera at Work but Unstable	Outside Production Impossible		
	ENG System	One System at Work One System out of order	Difficulties on News Gathering & Material Gathering	3 Sets of ENG System with Vehicle	
	Recording & Reproducing Equipment	Only One VTR & Telecine Equipment	Difficulties on Programme Recording & Reproducing		
	Master Control System	Superannuated, Trouble is frequent	Difficulties on Programme Sending No Promptitude for News	Renewal of Master Switcher	
	Continuity Studio	No Facility			
Transmitting Facilities	Kololo Tx Station	Superannuated Tx Inadequent Ant. Gain	Frequent Troubles Narrow Service Area	Renewal of Tx Facilities	Recover of Service Area (up to 65% of Population Same as Latter 1960s) Stabilization of Broadcasting Service
	Local Tx Station	All Stations out of service due to Destruction & Superannuated	Service Impossible	Rehabilitation of Each Tx Station (Soroti, Lira, Masaka & Mbarara)	

CHAPTER 4 BASIC DESIGN

CHAPTER 4. BASIC DESIGN

4-1 Design Policy

The following items are taken into consideration for the basic design:

(1) To arrange effectively the most suitable facility for the plan to obtain the best results.

(2) To select materials and construction method which are most suitable for the object of usage within the limited work period.

(3) To arrange that the construction work has no influences on the operation of existing equipment.

(4) To make full use of technical ability of Uganda, combine systematically the way for the supply of materials from Japan and the processing in Uganda, for the purpose of reducing the project cost.

(5) To design the facilities which take economical running, easy maintenance and management into consideration.
Also, the facilities have correspondence for future development and new technique.

(6) The specifications of facilities should abide by the technical standards of CCIR.
In designing the equipment, safety and rigidity are taken into consideration from electrical and mechanical view points.
Furthermore, future expansion should also be taken into account.
Spare parts shall include main parts and units as a general rule.

(7) Technical Standard

1) Television Standards CCIR B System
2) Colour Standards PAL System

4-2 Environmental Condition

(1) Geological Features

African continent is a plateau which has not got a crustal fold as a whole since the old geological age. The soil is almost of land layer except the coastal zone.

Highland of Uganda belongs to the tropical rain forest and marsh-land. From the land surface to 5 to 6 meters under, it is covered by the red clay soil called Murram or the tight clay sand.

(2) Earthquake

Soil is as a whole of old earth's crust. Although it is said to be stable and lacked of change, a few case of earthquake is so far reported.

During the period of 41 years from 1925 to 1966, occurrance of about 60 earthquakes (magnitude is more than 3) are reported. The largest one was magnitude 6. Most centres are in the mountainuous area of the south-western part.

As the detailed data of earthquake is not available, earthquake should be taken into full consideration in designing the tower and others.

(3) Electric Power

All the cities related to the project are connected with the power distribution lines of 132 kV or 33 kV. Power intake is AC 415/240 V, 3-phase, 4-wire, and it is expected to e enough capacity.

Voltage fluctuation, however, seems to be about 20%. The survey team explained the hazard of fluctuation against the electronic equipment and requested strongly to reduce the fluctuation to the electrical engineers of the Uganda Electric Board at the meeting. This matter should be also taken into consideration in designing. The concrete countermeasure for this voltage fluctuation is to install an automatic voltage regulator (AVR) for reducing and

control of the voltage fluctuation. Stabilized output voltage of AVR is supplied to each equipment.

(4) Telephone

The bad situation of the telephone system becomes a grave problems to UTV. As the instantaneous communication between Kampala Headquarters and local stations is impossible, Headquarters has great difficulties to grasp the situations of local stations.

When failure or problem occurs in a local station, Headquarters cannot make appropriate decision and give adequate instruction to the local stations without communication.

To solve this problem, UTV is planning to install SSB (Single Side Band) transceiver at Headquarters and local stations by own budget. This plan is already included in UTV's own schedule.

(5) Circumstances of Architecture

Destruction of buildings are found everywhere from the capital city Kampala, to the local cities. Besides the destruction of building and facing, electricity, water supply and drainage etc. in buildings have been causing problems together with inadequate infrastructures. Public buildings can be mostly used after repairing, but in Masaka and Mbarara, the destruction is extremely worse and many buildings cannot be used without reconstruction.

In Kampala, the capital city, many institutions are destroyed and left. Some of them were involved in revolution war while construction, and some of multi-storied buildings are left as they are with platforms and derricks.

Reconstruction begins gradually. In Kampala and local commercial cities, reconstruction and rehabilitation works are beginning. Main street in Kampala and local trunk road, the repair works are starting.

Construction materials, such as sand, gravel, brick, concrete block, timber etc., are self-supplied. However, many materials such as cement (partly produced, but demand is not covered), reinforcing bar, iron frame, veneer board, plastic finishing etc., depend upon the import.

Construction workers are not good enough in quantity and quality, because construction business hangs low for a long period. Labour cost is ¥500 to ¥1,000 per day.

For example,

Unskilled labourer	:	750 USh./day	(340 Yen/day)
Concrete worker	:	2,000 USh./day	(900 Yen/day)
Brick layer	:	2,000 USh./day	(900 Yen/day)

Note: USh means Ugandan Shilling

By observing the construction of multi-storied buildings in Kampala, the introduction of high technology seems to be advanced, and the technical level of private construction company is presumably high. UP&T has own section of tower construction, and they have already built many towers for UP&T and UTV, using winch, derrick and 35 ton wrecker. They are judged to have high capability for tower construction.

(6) Transportation

Before revolution war the pavement of major trunk road was good, but many damages are found at present, because no maintenance has been done in more than ten years. Especially in the city, the pavement come off and many holes are found due to heavy traffic. However, the repair works of trunk road are being made at a high pace in Kampala and in local district by the cooperation of Western European countries. Improvement is expected in the very near future. The width of pavement in the trunk road is generally 8 metres.

Access roads from the trunk road to each site are all unpaved, but generally good. A large vehicle can go through these access roads.

Import by the land transportation is as follows:
After unloading at Port Mombasa in Kenya, cargos are transported via Nairobi to Tororo where the customs is cleared. Transportation cost from Mombasa to each site is the same as to Kampala. In the way from Tororo to each site, the loading and unloading at Kampala and inland transportation from Kampala to each site are omitted, and favourable in time and economy. Railway transportation by URC (Uganda Railway Corporation) is not well expected due to inadequate maintenance of trains and unfavourable time schedule.

4-3 Basic Design

(1) Facilities of Kampala Station

Although Kampala station provides the organizational function of Headquarters and master station for local stations, it lacks the necessary and basic facilities and housing as well as studios. In view of long-term plan, it is desirable to move all the functions of Kampala Headquarters to the newly-built housing. In the project the following rehabilitations are taken up:

1) Studio B

In order to use this studio as a normal TV studio, a set of camera, video, audio and lighting equipment are newly installed.

The related works to ceiling, roof, sound insulation etc., are done by UTV.

Although Kampala Headquarters has three TV studios, Studio David can be used barely, and other two studios have no equipment inside.

Equipment of Studio David is less than that of normal TV studio, and UTV is using this one, because no other studio is available.

Even if UTV staff has strong volition to produce educational, news and general programmes, he is forced to abandon it, because of the restriction in the usage of only one studio, one VTR and insufficient facilities.

To improve such condition, and enhance the functional capability of programme production, a set of equipment for studio B will be renewed.

Studio B was originally designed for the production using OB Van, i.e. cameras and microphones are carried from the Van into studio, and the switching is done in the Van. Therefore, no space is left for sub-control and UTV has a plan to make a space for sub-control equipment, and its design has finished lately.

After rehabilitation, Studio B will be used to play a nuclear function in the programme production in UTV. As the studio schedule have enough time in the daytime and evening, even if the live newscast begins, ample time can be shared for a programme production (recording in VTR), and the improvement of programme quality will be expected. At the same time, ENG system which has formerly been used for the backup of the shortage of studio, can be used for its original purpose, and it will bring more ample time in the field production.

2) Air Conditioning Facilities

According to the remodelling of Studio B, one set of air conditioning facilities which has enough capacity not only for Studio B but also to cover main machine rooms etc., will be newly installed.

At present, air conditioner, fans and ducts are installed over the ceiling, and cooling tower outside, and they are out of order. All the facilities are quite superannuated, and procurement of spare parts is very difficult. As they have stopped the operation for the past ten years, the repairing and recovery seem to be impossible. All the facilities will be renewed, and the noise sources such as air conditioner, fan etc., will be put outside.

At present, Studio David is used without air conditioning, because the heat generation from a few lanterns is a little. However, the room temperature rises high in during production, and it becomes very hot inside. Air condition is essential for Studio B, because the studio has a standard lighting system.

Besides Studio B, the air conditioning facilities of main machine rooms of which rehabilitations are scheduled in the project will be renewed.

3) TV Master Control Room

Master switcher which plays an important role in the programme continuity, will be renewed.

Master control is one of the important facilities. It switches the various signals from studio, VTR and telecine, and sends the programme to transmitting station.

As all facilities are antiquated the renewal of them are desirable. However, in the project, the switcher, a nucleus of the system and a part of its peripheral equipment will be renewed. Stability of programme continuity, and improvement of picture will be expected thereby.

4) STL Transmitter

A set of new STL transmitter (including a stand-by) for sending the programmes to Kololo station will be installed.

The STL transmits the programme sent from the master control room of Nakasero Headquarters to Kololo station by microwaves. As the existing STL is of portable type, it gives noise to the picture, lacks the stability, and is inadequate for broadcasting. When the transmission by STL is interrupted, not only Kololo, but also Mbale, Soroti and Lira stations, which receive the radiated signal of Kololo, are all stopped.

Considering its importance, the STL has a dual system including a standby. Switching to the standby equipment is made automatically, when a failure occurs.

5) ENG System with Vehicle

English, the official language in Uganda, is used in TV programmes sent from Kampala to local stations.

For some local people who speaks their own tribal languages in daily life, it is not so easy to understand such programmes in English and content of some programmes are not so familiar for them.

ENG system with vehicle can go everywhere and produce local programmes in tribal language there easily.

Three sets of ENG system with vehicle are disposed.

At the same time, one vehicle for maintenance of transmitting stations in northern district is disposed at Soroti transmitting station.

6) Recording and Reproducing Facilities

Increase of 3/4-inch VTRs and editors will be made, at the minimum scale.

Installation plan of more several ENG systems (3/4-inch, Umatic) is scheduled by Japanese grant aid and own budget. After the accomplishment of this plan, the number of recorded tapes will increase, and an existing editor cannot manage the editing. To cope with these conditions 3/4-inch editors are established.

Rehabilitation plan of studios and their peripheries is shown in Table 4-2.

(2) Kololo Transmitting Station

1) Transmitter and Peripheral Equipment

According to the UTV's self budget plan with Japanese DRG, a 10 kW-transmitter will be installed until the end of 1985.

Kololo station not only covers the capital city of Kampala and suburbs where are important politically and socially, but also relay the programmes to the major local stations in the north-eastern part, such as Mbale, Soroti and Lira.

As the population of Kampala and its satellite cities such as Jinja, Entebbe etc., is increasing, the improvement of reception of these areas is desired.

To solve these problems, the following two plans are made:

a) The dual system of transmitter is adopted in Kololo station, i.e., the one by UTV's plan, and the other by the grant aid plan. Thereby, reliability of not only Kololo, but Mbale, Soroti and Lira stations become high. Furthermore, maintenance work becomes easy, i.e. while broadcasting, maintenance can be done for another transmitter.

b) The output power is increased up to 10 kW. The reception in Kampala and its suburbs will be improved.

At the same time, the peripheral equipment such as programme input and monitoring equipment, STL etc., are renewed, due to low stability and insufficient function. Thus, overall stability and function of the transmitting system will be greatly improved.

2) Transmitting Antenna and Tower

At first, a simplified V-type, antenna with 12-stack was mounted. As this antenna had not enough characteristic and performance for broadcasting, UTV tried to replace it with a 4-dipole antenna, 4-panel, 4-stack. However, they found the shortage of load capacity of tower and swing and bend of tower, and the work was stopped.

The existing guyed tower of 150 m height has a little slant on the upper part which occurred at the antenna replacement.

At present, 4-dipole antenna, 1-stack, 4-panel is mounted, and it brings the decrease of coverage area, because of its low efficiency.

For extending service area, considering the economy, it is necessary to install a 4-dipole antenna with 4-stack, 3-panel for inland, and 1-stack, 1-panel for Lake Victoria.

At the same time, the tower should be renewed for ensuring enough load capacity against the said standard 4-dipole antenna of high performance.

For antenna and tower, the following items are planned:

a) Antenna is renewed to a 4-dipole antenna with 4-stack, 3-panel and 1-stack, 1-panel. It improves the coverage area and the receiving field intensity for the off-air reception at Mbale in the east and reception in the surrounding cities.

b) Tower is renewed. The load capacity should be large enough for a 4-dipole antenna with 4-stack, 3-panel and 1-stack, 1-panel. Type of the tower is self-supported, square shaped, because the site of Kololo is narrow, and many towers of Army and UP&T are built intricately nearby.

(3) Transmitting Facilities of Major Local stations

1) Soroti Station

It receives the radiated signal from Mbale station, serves Soroti area and transmits the signal to Lira Station.

Soroti city is a centre of politics, economy and society in the northern port of Uganda, and also takes an important position in administration and geography.

The renewal plan to serve stable broadcast and maintain the flow of information by rehabilitation plays an important role in enhancement and improvement of inhabitants' life, spread of school and social education and offering of entertainment.

According to the UTV's plan, a set of receiver for off-air relay is renewed.

UTV announces that the emission of existing 5 kW transmitter is possible, according to the test operation by UTV.

However, the transmitter is very old, made in 1975, and in the past ten years, the continuous transmission has never been done, except short-time testing. Its reliability is questionable. Considering the difficulties of procuring spare parts, (the manufacturer stopped the making of this model, and the spare parts are not available), even if the transmission is temporarily possible, it will presumably become out of order sooner or later.

As the existing simplified V-type 12-stack antenna has low performance, it is necessary to replace it with new high-gain antenna to improve reception in the surrounding areas. The existing tower, same as in Kololo Station, cannot bear the load of the new antenna.

Considering above conditions the following items are planned:

a) A 5 kW-transmitter, the peripheral equipment, such as programme input and monitoring equipment, AVR, feeder etc., will be all renewed. By adding an output coaxial switch, the existing transmitter is remodelled to a standby one.

b) Antenna is replaced with a 4-dipole antenna with 4-stack, 4-panel. At the same time, the tower is renewed to a guyed one of 150 m height with enough load capacity.

2) Lira Station

This station receives radiated signal from Soroti station, and rebroadcasts the programme in the service area, and Gulu station

which is supposed to be rehabilitated by UTV, receives the signal for broadcasting.

Lira is the second most important city, next to Soroti in the northern part and is situated in the middle of Soroti city and the farthest northern major city of Gulu.

The information flow is delayed, as the city is located far from the capital city Kampala. In such case, the video information by TV broadcasting gives a measure to access directly to the capital. At the same time, the promotion of national unity, enhancement of life, spread and improvement of school and social education are also expected by TV.

UTV is going to renew a set of transmitting facilities such as 5 kW-transmitter, programme input and monitoring equipment, off-air relay receiver, AVR etc., by UTV Plan.

In order to increase the effective radiated power of 5 kW-transmitter, the existing simplified antenna of V-type, 12-stack is insufficient, and it is necessary to replace it with a 4-dipole antenna of high performance, and to erect a new tower which bears the new antenna load capacity.

Existing antenna and tower are of the same design as of Soroti station. Its directivity is questionable. Without the dehydrator, water comes into main feeder, heightening the VSWR value. The tower also cannot bear the load of new antenna.

Considering these conditions, the following items are planned:

a) Antenna is renewed with a 4-dipole antenna, 4-stack, 4-panel. By the improvement of radiation efficiency, the reception in the surrounding areas will be upgraded.

b) As the site is wide enough and flat, a new guyed tower of 150 m in height which bears the load capacity of the new antenna is erected.

3) Masaka Station

Masaka faces on the trunk road from Kampala to Tanzania, the neighbouring country, and is a centre of politics, economy and the district administration.

Although this city is comparatively near the capital city of Kampala, the information flow is insufficient due to the poor communication system.

The stable TV broadcasting plays an important role in improvement of social welfare, spread of education. At the same time, it is expected to offer appropriate information and entertainment, thus encouraging the people who are undertaking renovation works of destructed facilities.

UTV is going to renew all the facilities including antenna, tower, transmitter etc. by UTV Plan.

TV programmes are sent from Kampala using microwave links of UP&T, and the off-air relay system is not adopted as in the north-east.

This link has two channels, of which main channel is used for telephone, and TV uses the other backup.

Therefore, if a failure occurs in the main channel, telephone which has higher priority, it will be switched to the backup channel, thus TV transmission is forced to interrupt. To avoid such risk, and maintain the stable TV service, the backup system of programme transmission is of necessity. At present stage, the off-air relay is considered for the backup.

As a measure of backup, the following plan is considered same as of Soroti station.

a) A new off-air programme relay system is installed. In case the failure of microwave link, received signal of Kololo station (Kampala) enables the continuation of stable broadcasting.

4) Mbarara Station

Mbarara city is situated at the middle point between Kampala and Kabale which is near the border of Ruwanda, and faces on the trunk road from Kampala to Tanzania being geographically in a good position. It occupies an important position geographically. It is also a central city of the western part, and a nucleus of politics, economy and society in the administrative district. Maintaining of stable broadcasting is necessary in view of the importance of the city in the western part of the country. It contributes to the improvement of peoples' life as well as welfare and spread of school and social education.

The condition and plan of rehabilitation are the same as in Masaka station mentioned above.

The off-air relay system is essential as a backup of programme relay for receiving the radiated signal from Masaka station when failure of microwave link is occurred.

The following rehabilitation is planned in Masaka station:

a) As a backup of programme relay, a set of off-air relay receiver which receive the signal from Masaka station is installed. Thereby, broadcast can be continued while failure of the microwave link.

Outline of rehabilitation concerning the transmitting facilities is shown in Table 4-1.

Table 4-1 REHABILITATED EQUIPMENT LIST FOR PROGRAMME PRODUCTION & TRANSMISSION

Studio B	Colour Camera Chain	3 sets
	Video Control Equipment	1 set
	Video Monitoring Equipment	1 "
	Lighting Equipment	1 "
	Character Generator	1 "
	Microphone and Accessary	1 "
	Audio Control Equipment	1 "
	Audio Tape Recorder/Reproducer	1 "
	Disc Player	1 "
	Audio Monitoring Equipment	1 "
	Intercommunication System	1 "
ENG	With Vehicle	3 sets
Master Control	Sync. Signal Generator	1 set
	Test Signal Generator	1 "
	Master Switcher	1 "
	Monitoring Equipment	1 "
	STL Transmitter	1 "
	Intercommunication System	1 "
VTR	Editing Equipment	2 sets
Air Conditioner	Studio B	1 set
	Studio B Subcontrol Room	1 "
	Studio B Dimmer Room	1 "
	Master Control Room	1 "

Table 4-2 Rehabilitated Equipment List of Transmitting Station

Station Name	Kampala	Soroti	Lira	Masaka	Mbarara
Transmitter	○	○			
Coaxial Equipment	○	○			
Main Feeder	○	○			
Transmitting Antenna	○	○	○		
Mast	○	○	○		
PIE & Monitoring Eqp't	○	○			
Studio Transmitter Link	○				
Off-air Receiver				○	○
Receiving Antenna				○	○
Automatic Voltage Reg.	○	○			

4-4 Drawings of Basic Design

The layout chart and block diagram of programme production and continuity facilities in kampala Station, as well as layout charts and block diagrams of Kololo, Soroti, Lira, Masaka and Mbarara transmitting stations, are shown in the following drawings.

FIG. 1 Location of Kampala Station

FIG. 2 Floor Plan of Nakasero UTV Headquarters

FIG. 3 Floor Plan of Studio Complex in UTV Headquarters

FIG. 4 Floor Layout of Equipment in Subcontrol Room for Studio B

FIG. 5 Block Diagram of Studio B Subcontrol Equipment

FIG. 6 Block Diagram of Studio B Lighting System

FIG. 7 Arrangement of Suspension Equipment of Lighting System in Studio B

FIG. 8 Floor Layout of Equipment in Dimmer Room of Studio B

FIG. 9 Floor Layout of Equipment in Master Control Room

FIG. 10 Block Diagram of TV Master Switching Equipment

FIG. 11 Floor Layout of STL Equipment

FIG. 12 Site Plan of Kololo Transmitting Station

FIG. 13 Floor Plan of Kololo Transmitting Station

FIG. 14 Floor Layout of Transmitting Facilities in Kololo Station

FIG. 15 Block Diagram of TV Transmitting System in Kololo Station

FIG. 16 Self Supported Tower for Kololo Transmitting Station

FIG. 17 Location of Soroti Station

FIG. 18 Site Plan of Soroti Transmitting Station

FIG. 19 Floor Plan of Soroti Transmitting Station

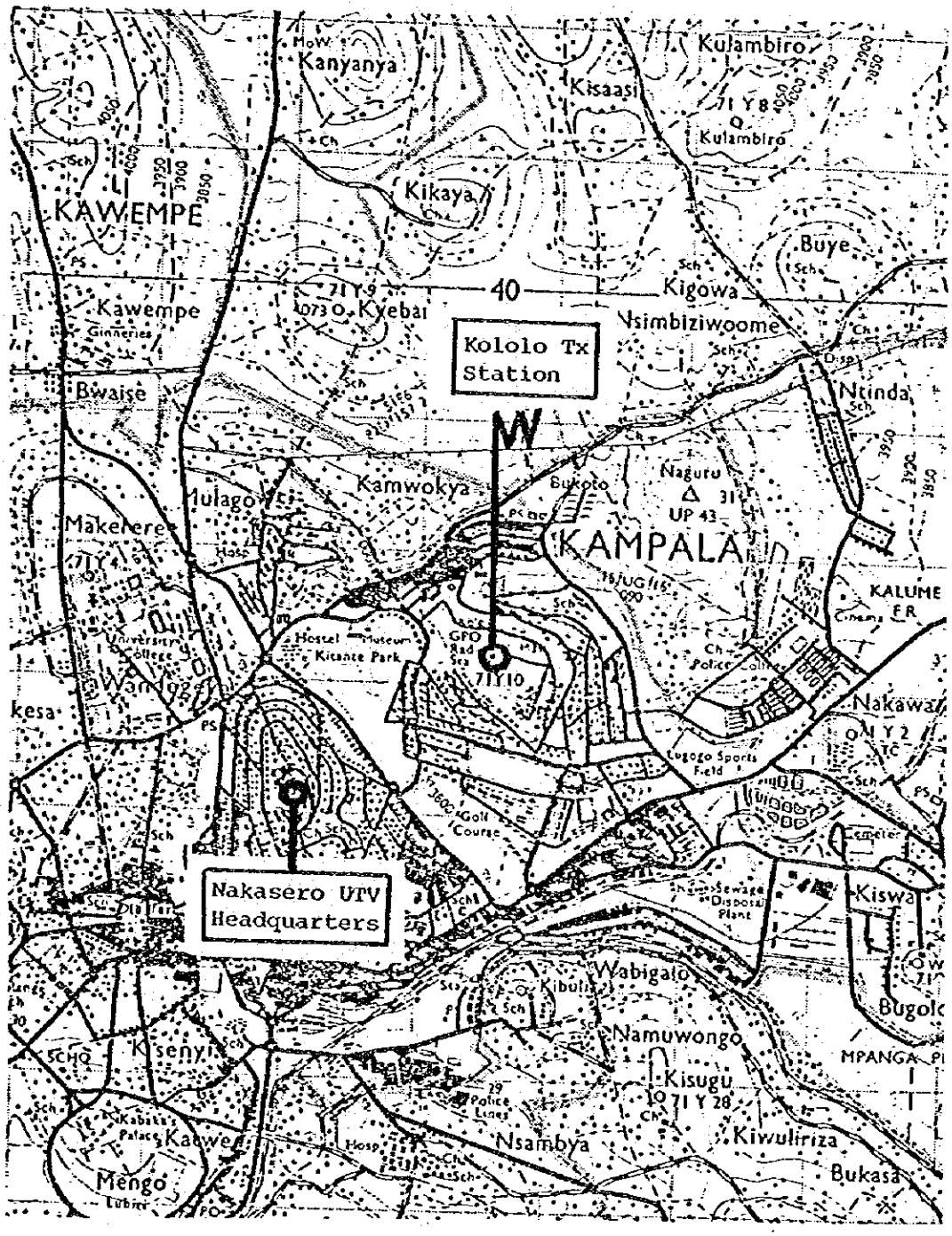
FIG. 20 Floor Layout of Transmitting Facilities in Soroti Station (1)

FIG. 21 Floor Layout of Transmitting Facilities in Soroti Station (2)

FIG. 22 Block Diagram of TV Transmitting System in Soroti Station

FIG. 23 Guyed Tower for Soroti Transmitting Station

FIG. 1 Location of Kampala Station



N E	00°20'14" 32°35'29"
Altitude	1,310 m
Map No.	71-1

FIG. 2 Floor Plan of Nakasero UTV Headquarters

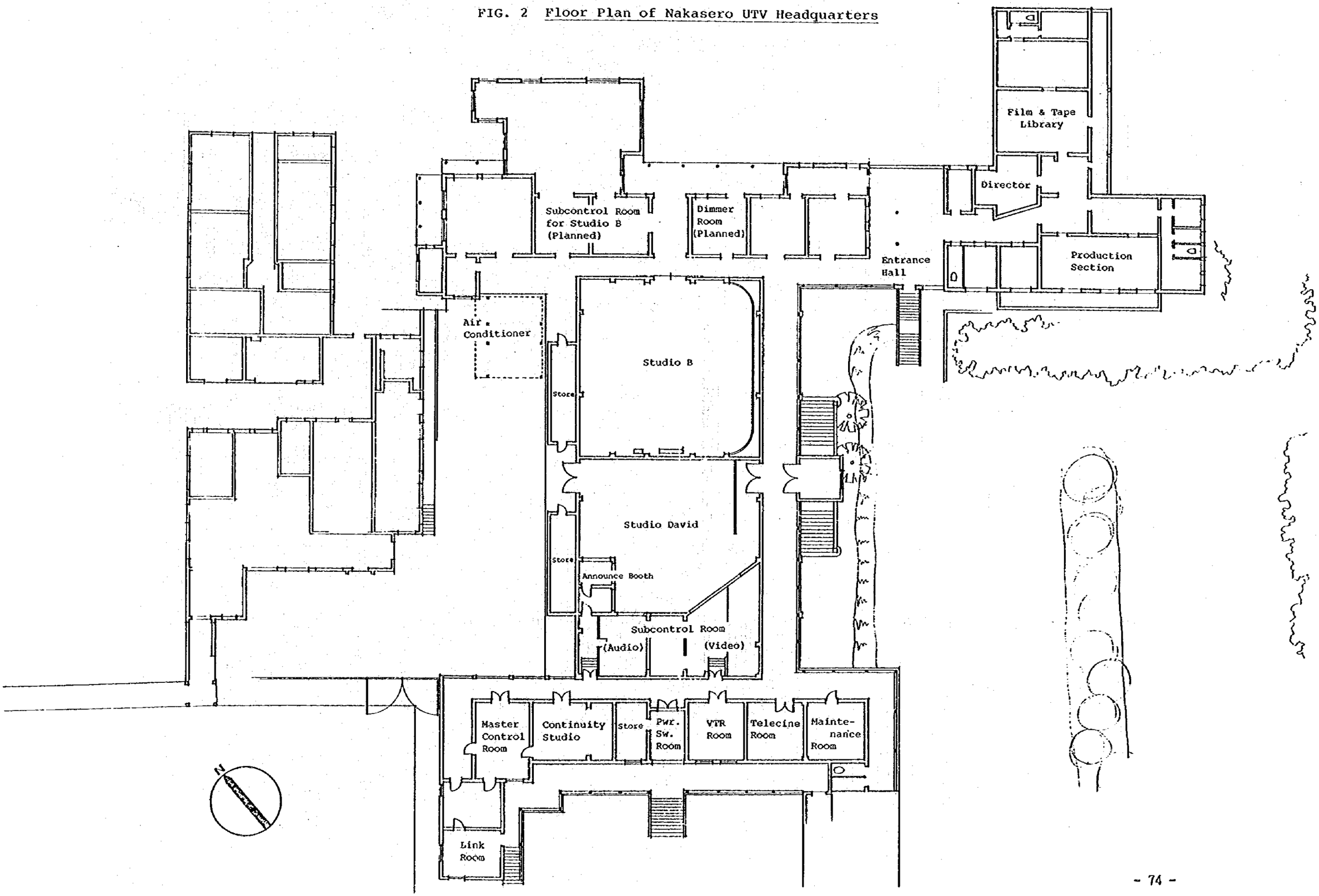


FIG. 3 Floor Plan of Studio Complex in UTV Headquarters

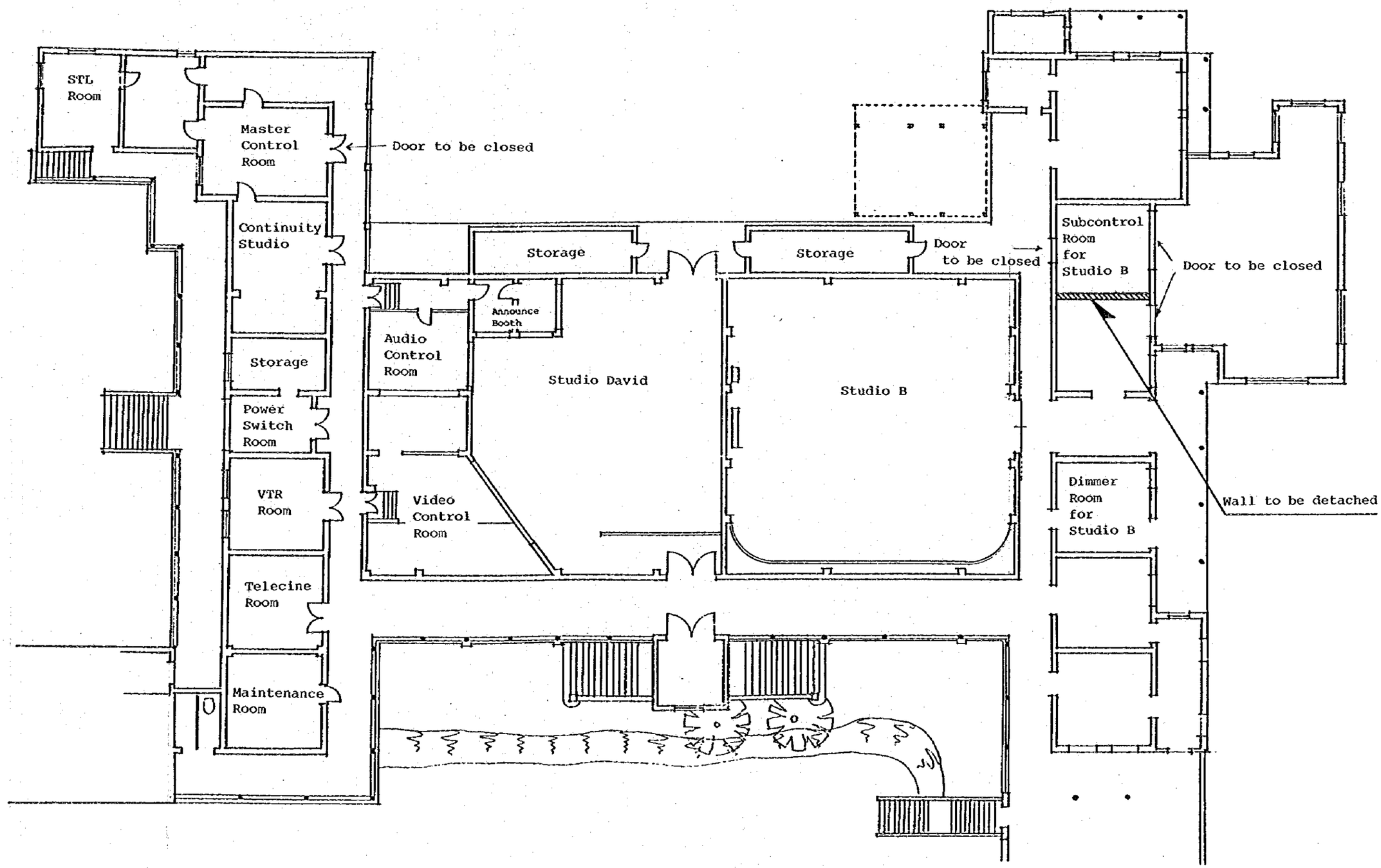


FIG. 4 Floor Layout of Equipment in Subcontrol Room for Studio B

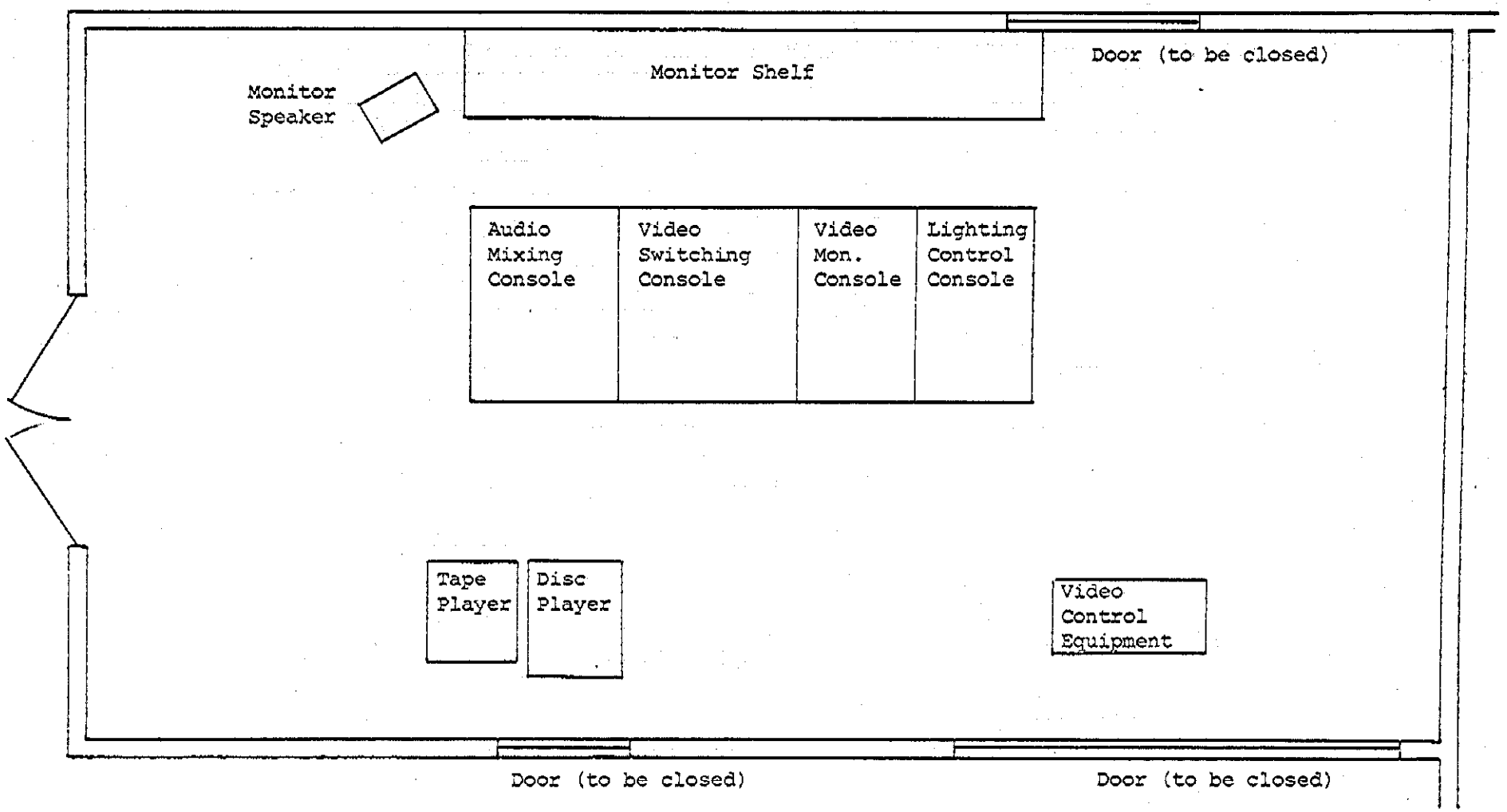


FIG. 5 Block Diagram of Studio B Subcontrol Equipment

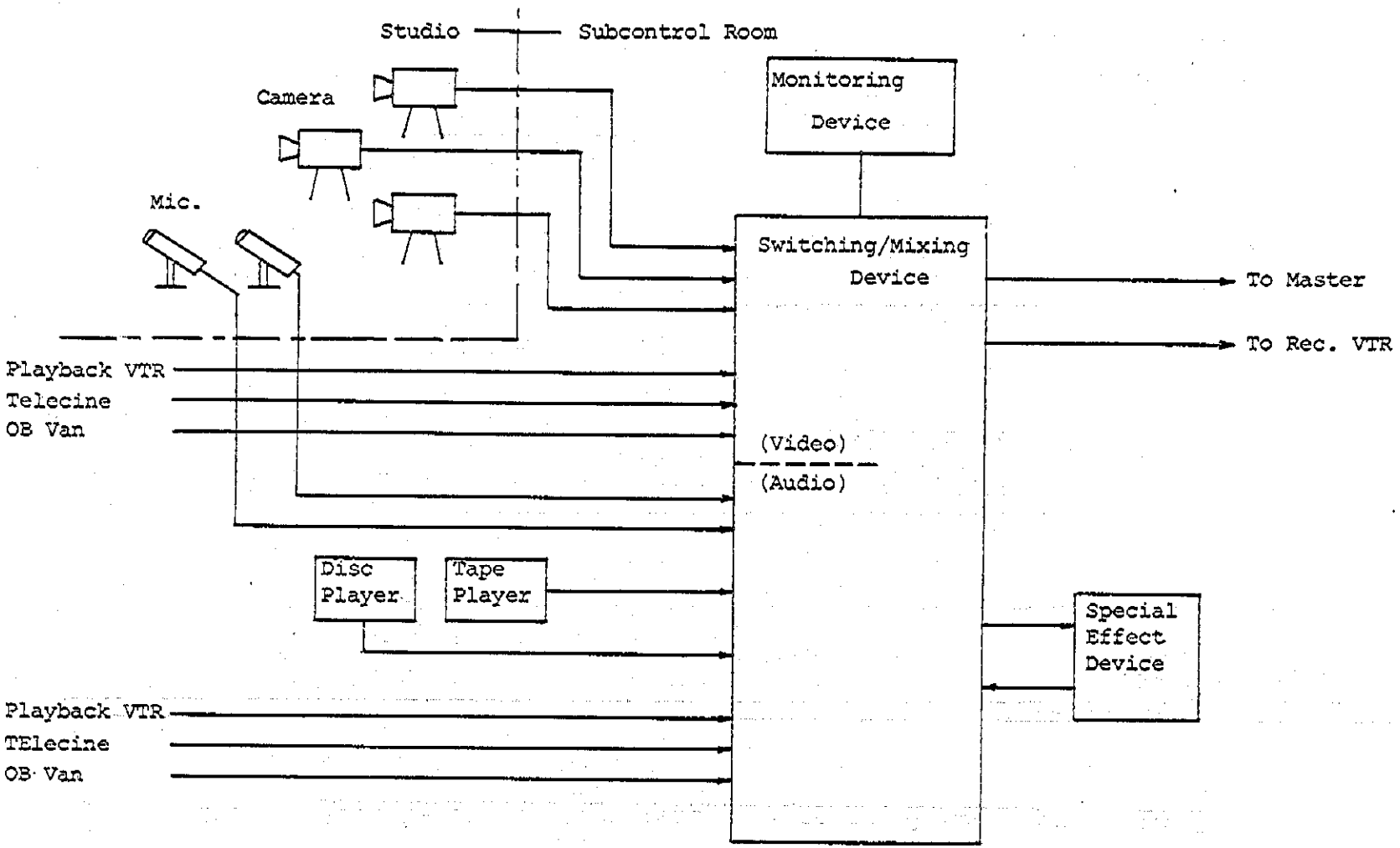


FIG. 6 Block Diagram of Studio B Lighting System

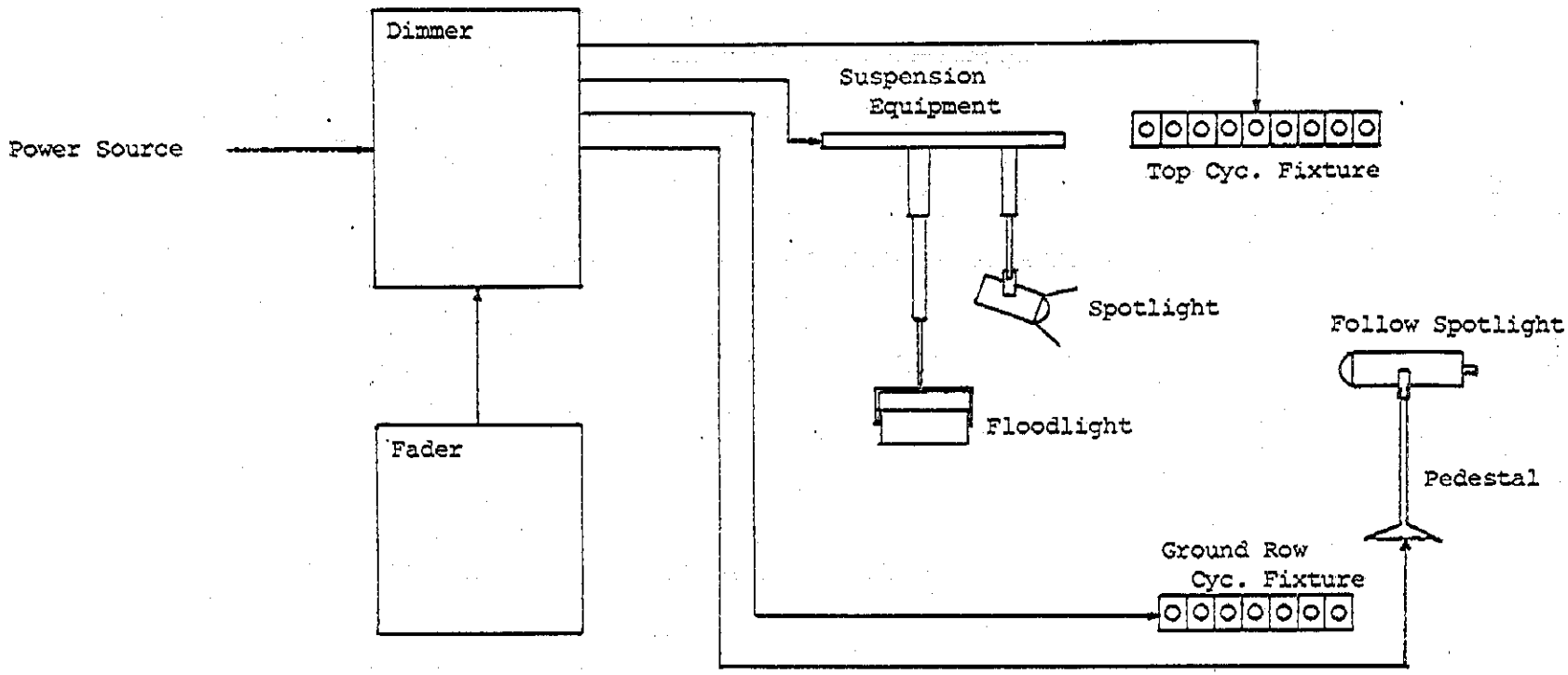


FIG. 7 Arrangement of Suspension Equipment of Lighting System in Studio B

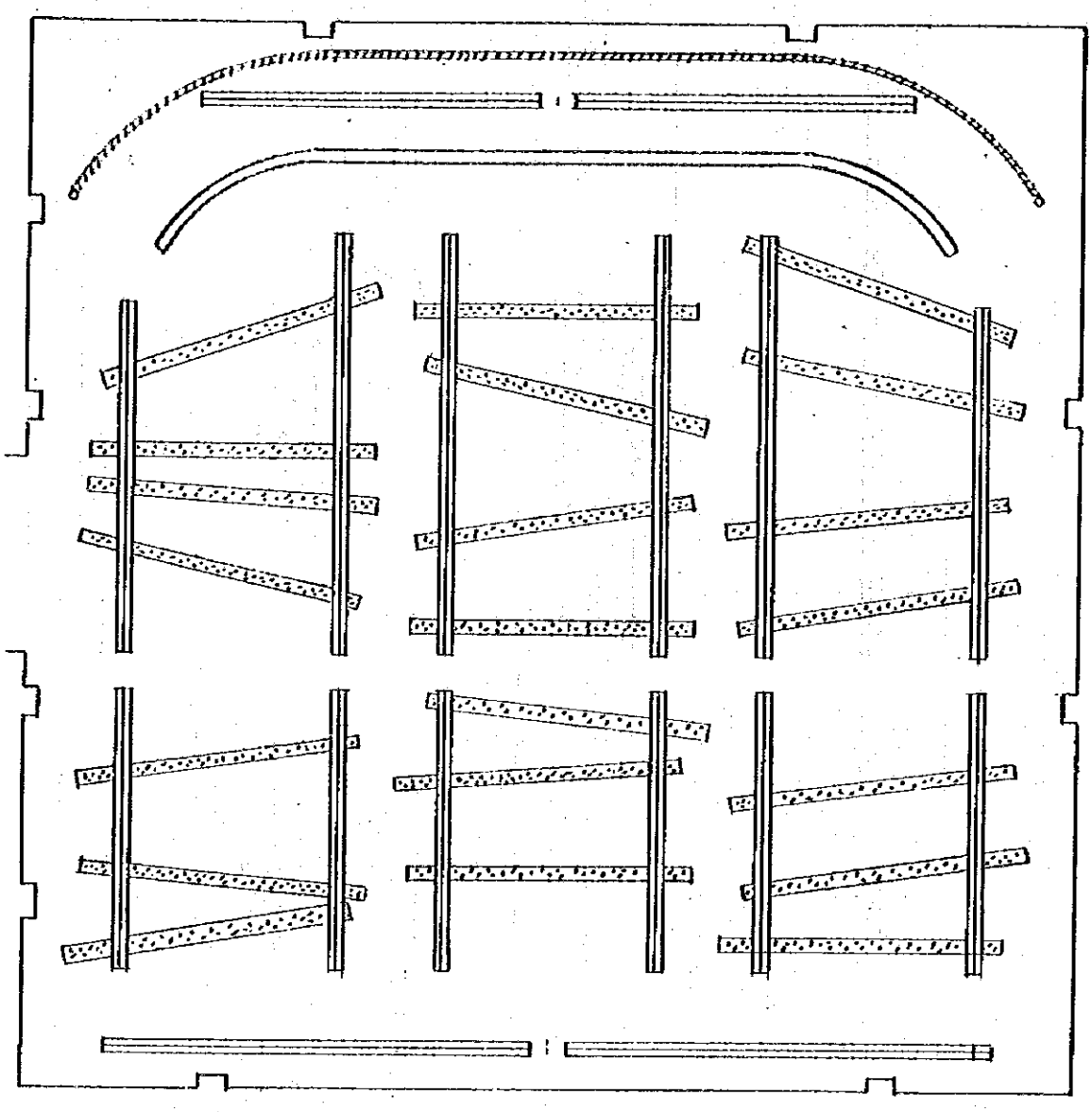


FIG. 8 Floor Layout of Equipment in Dimmer Room of Studio B

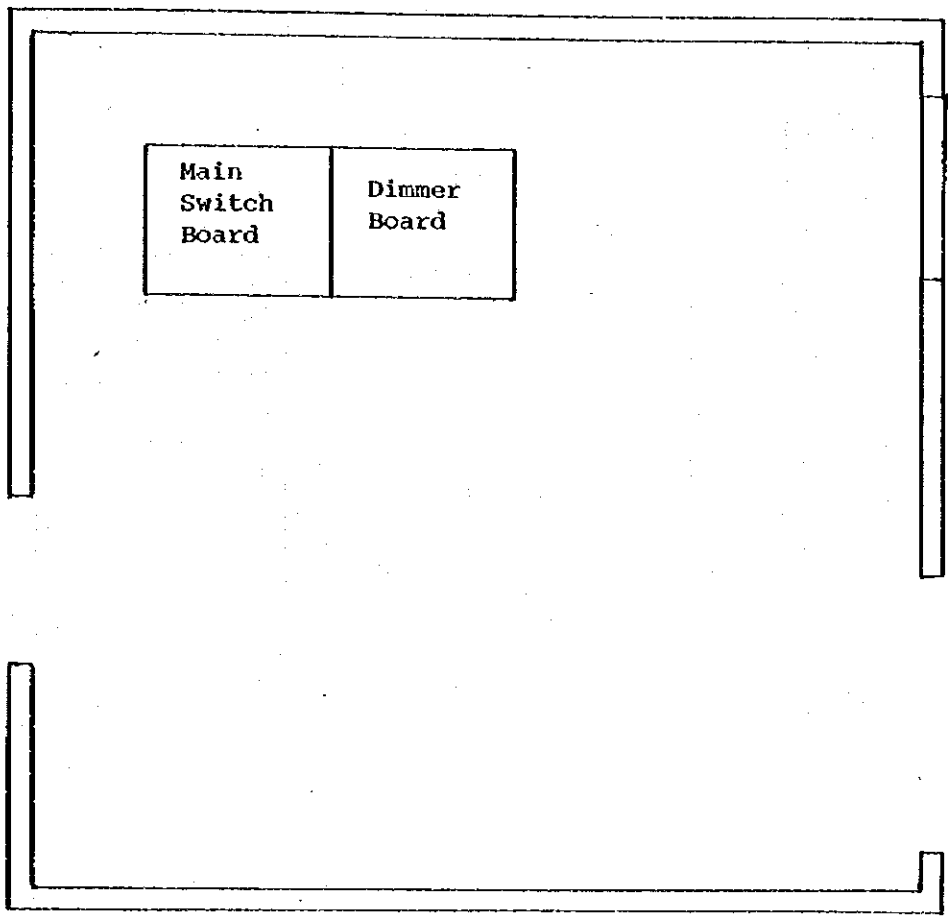


FIG. 9 Floor Layout of Equipment in Master Control Room

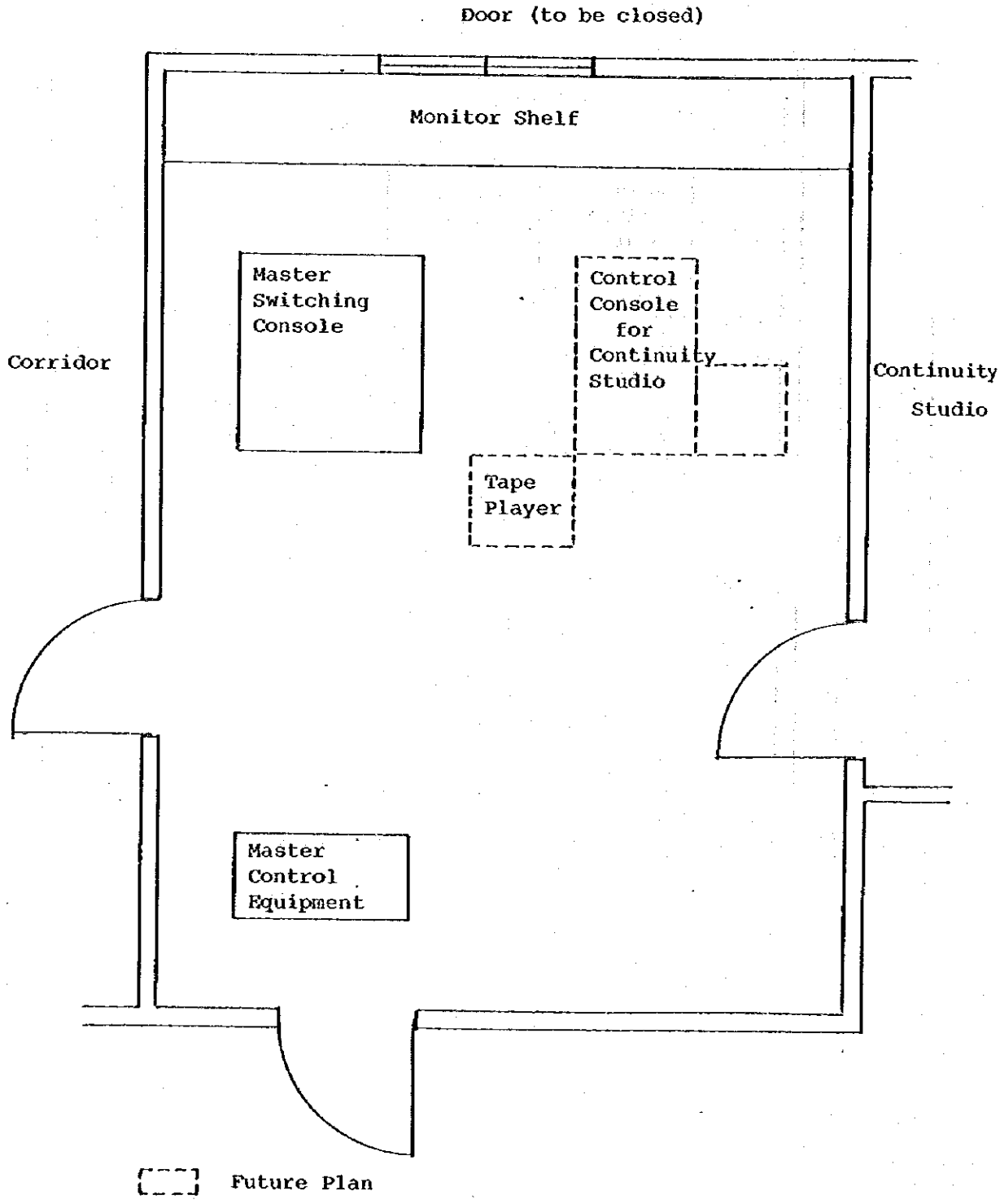


FIG. 10 Block Diagram of TV Master Switching Equipment

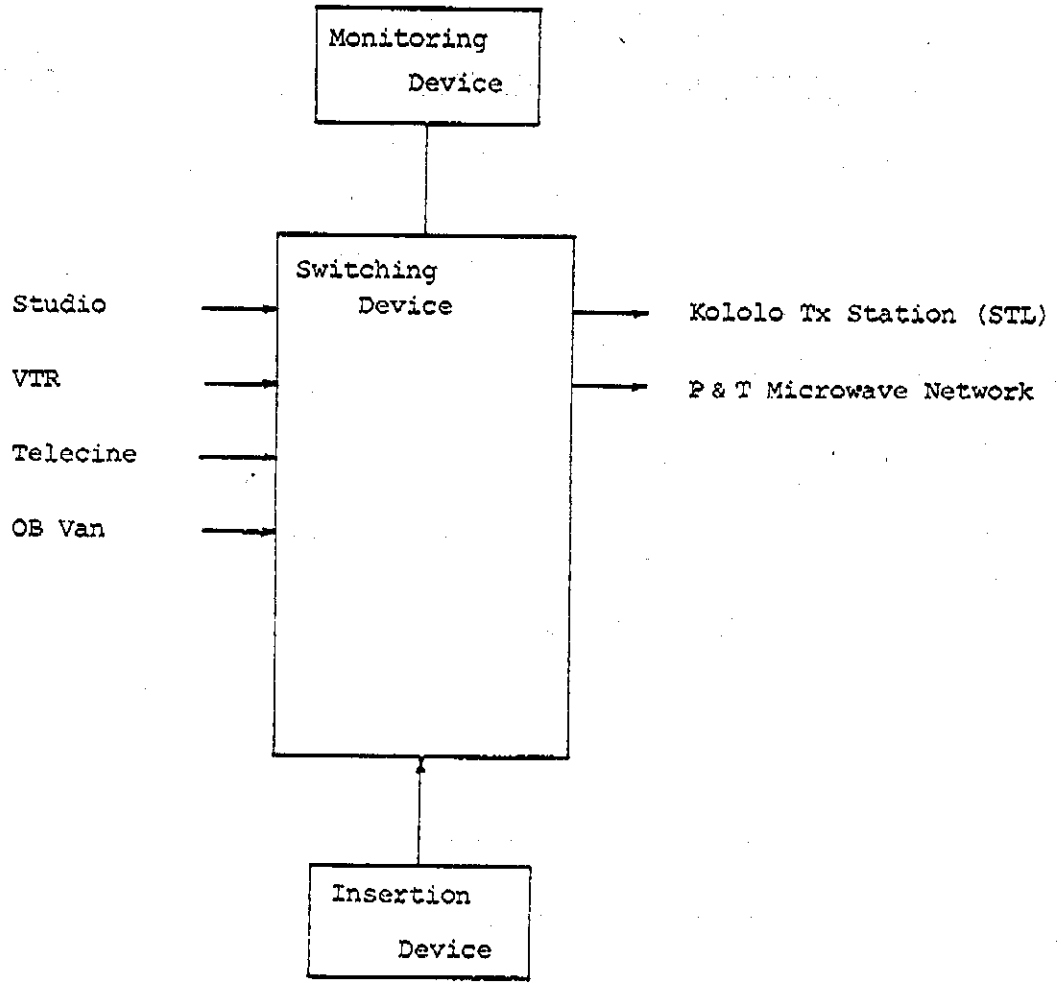


FIG. 11 Floor Layout of STL Equipment

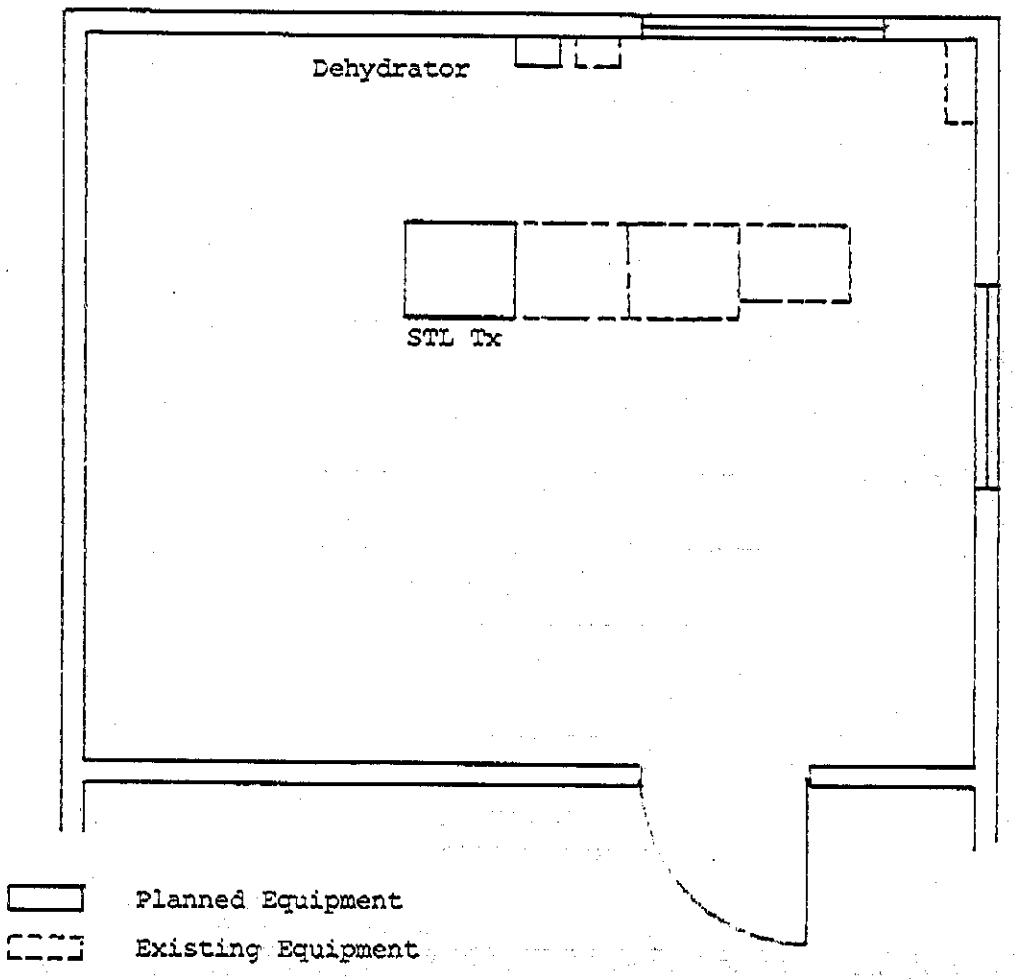


FIG. 12 Site Plan of Kololo Transmitting Station

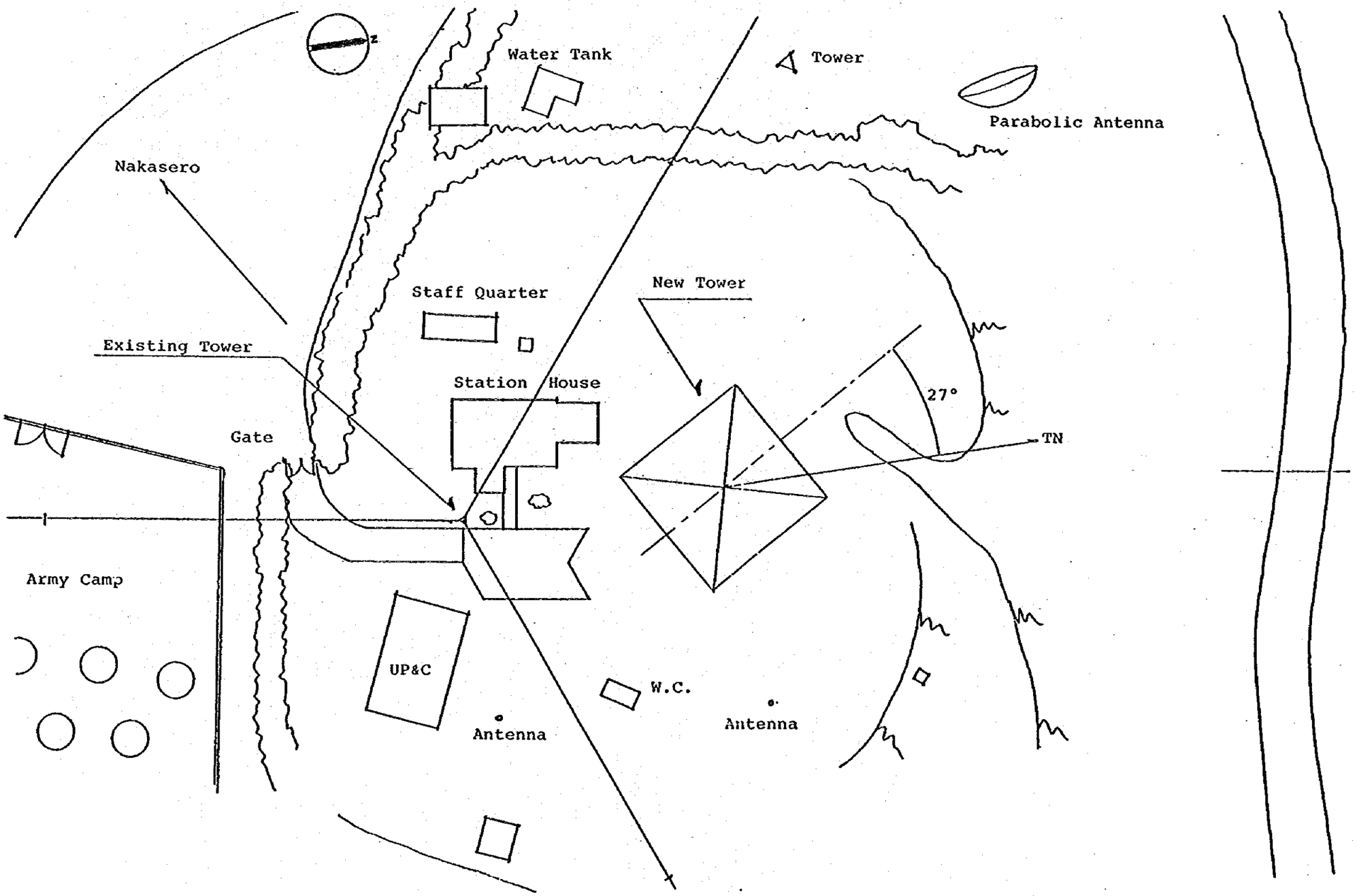


FIG. 13 Floor Plan of Kololo Transmitting Station

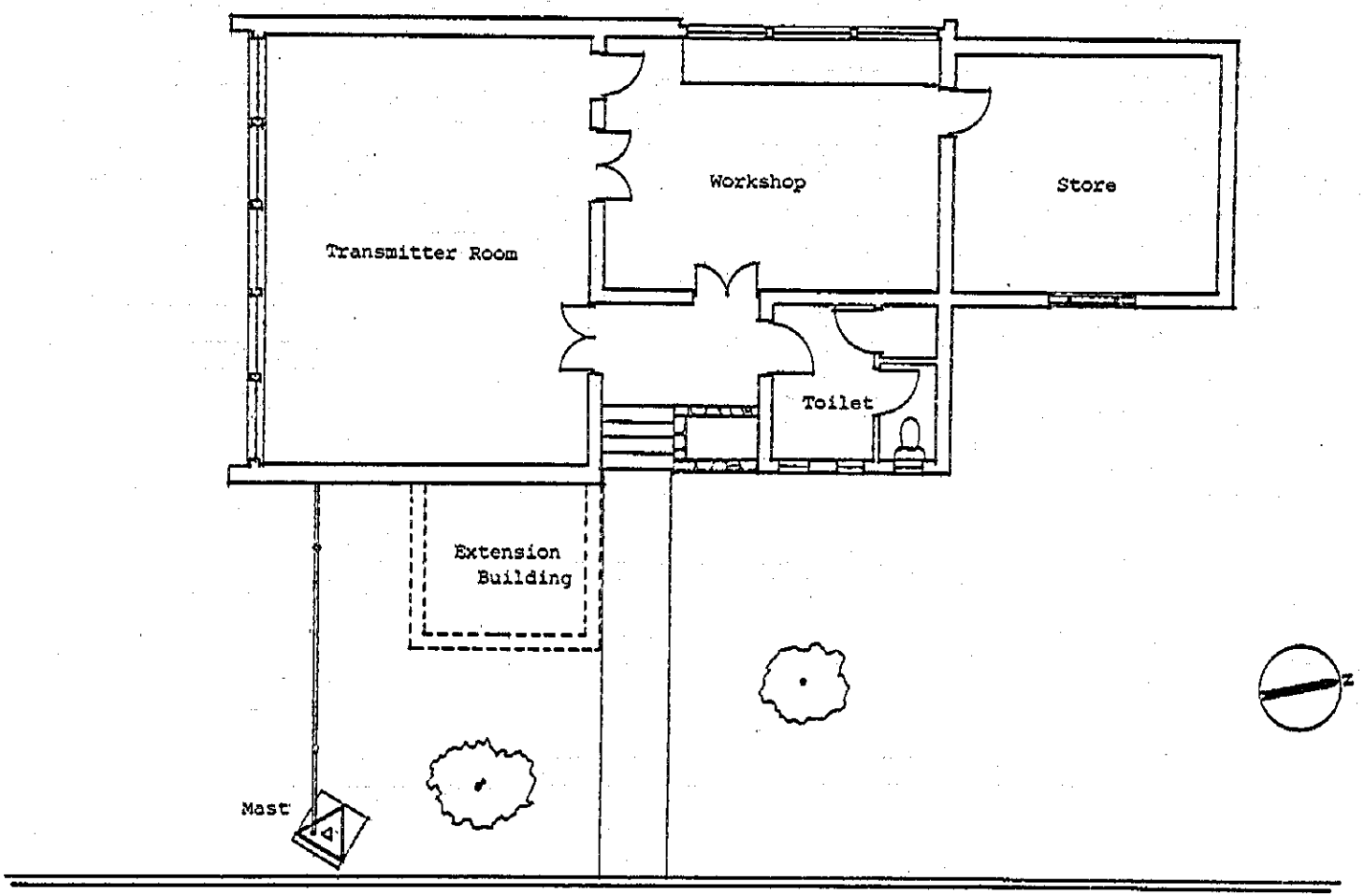


FIG. 14 Floor Layout of Transmitting Facilities in Kololo Station

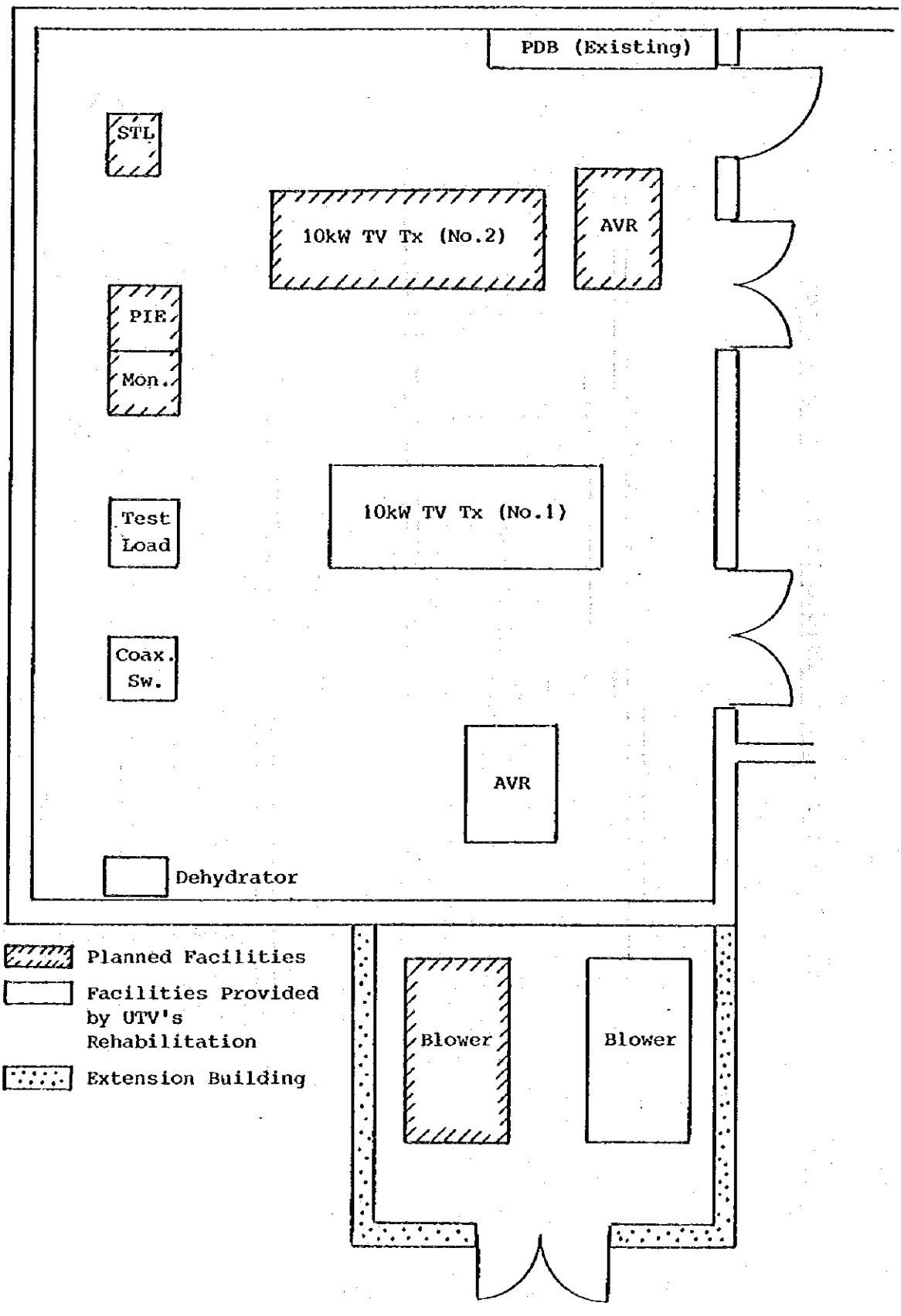


FIG. 15 Block Diagram of TV Transmitting System in Kololo Station

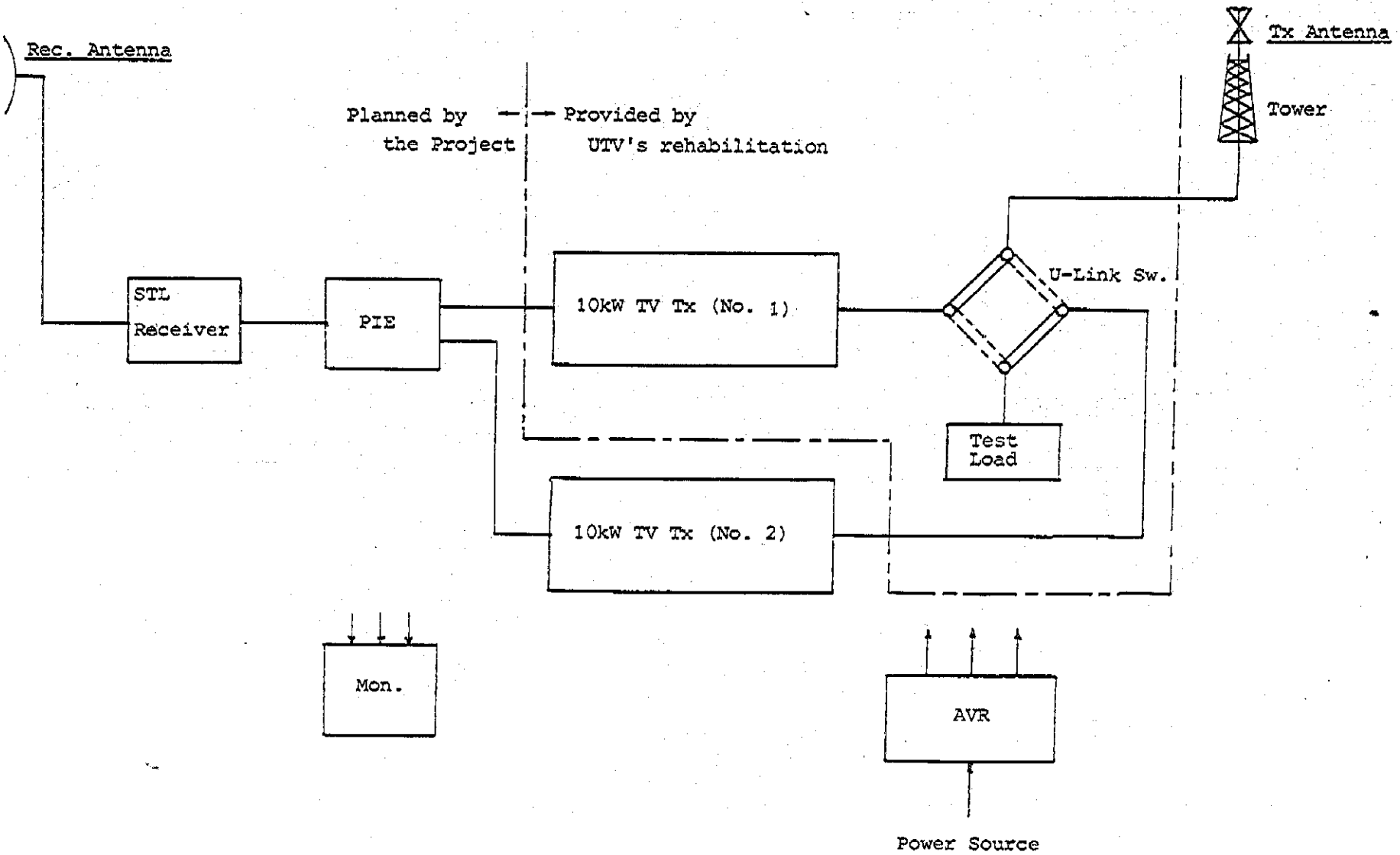


FIG. 16 Self Supported Tower for Kololo Transmitting Station

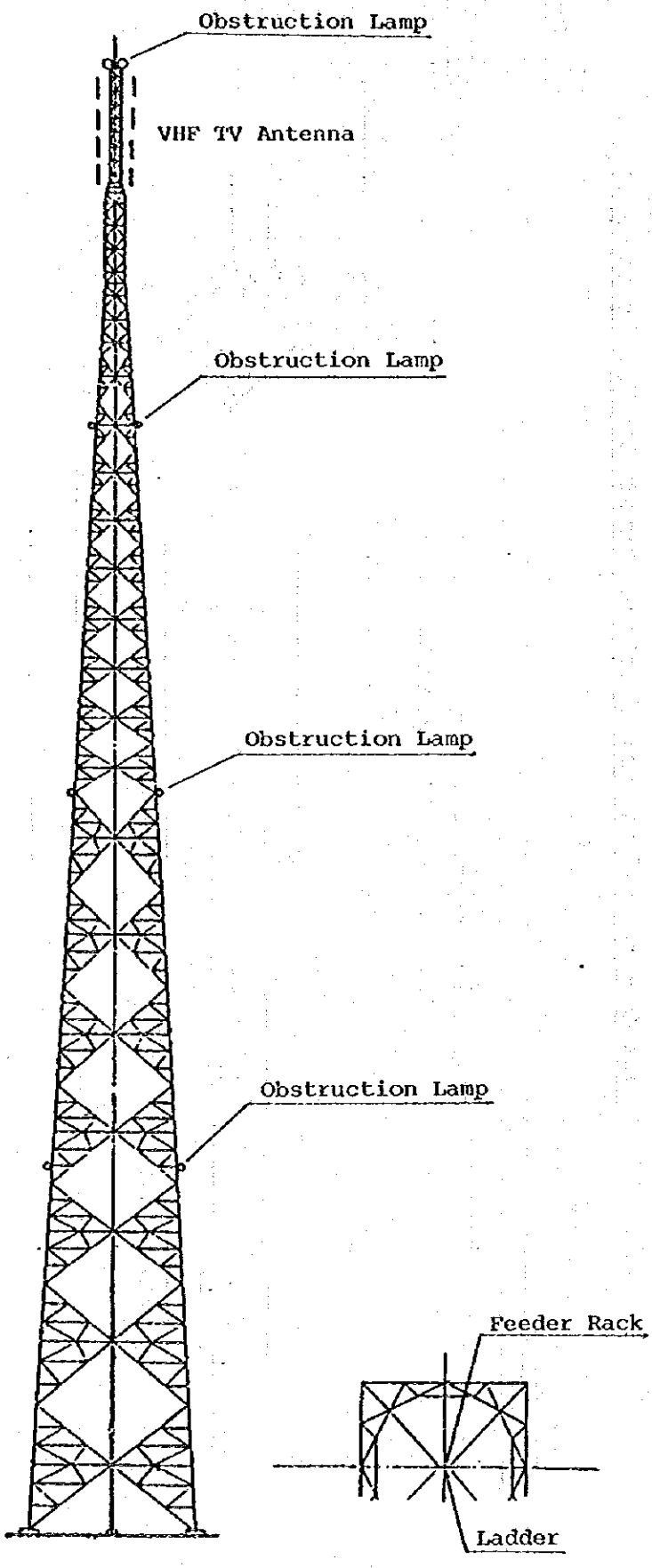
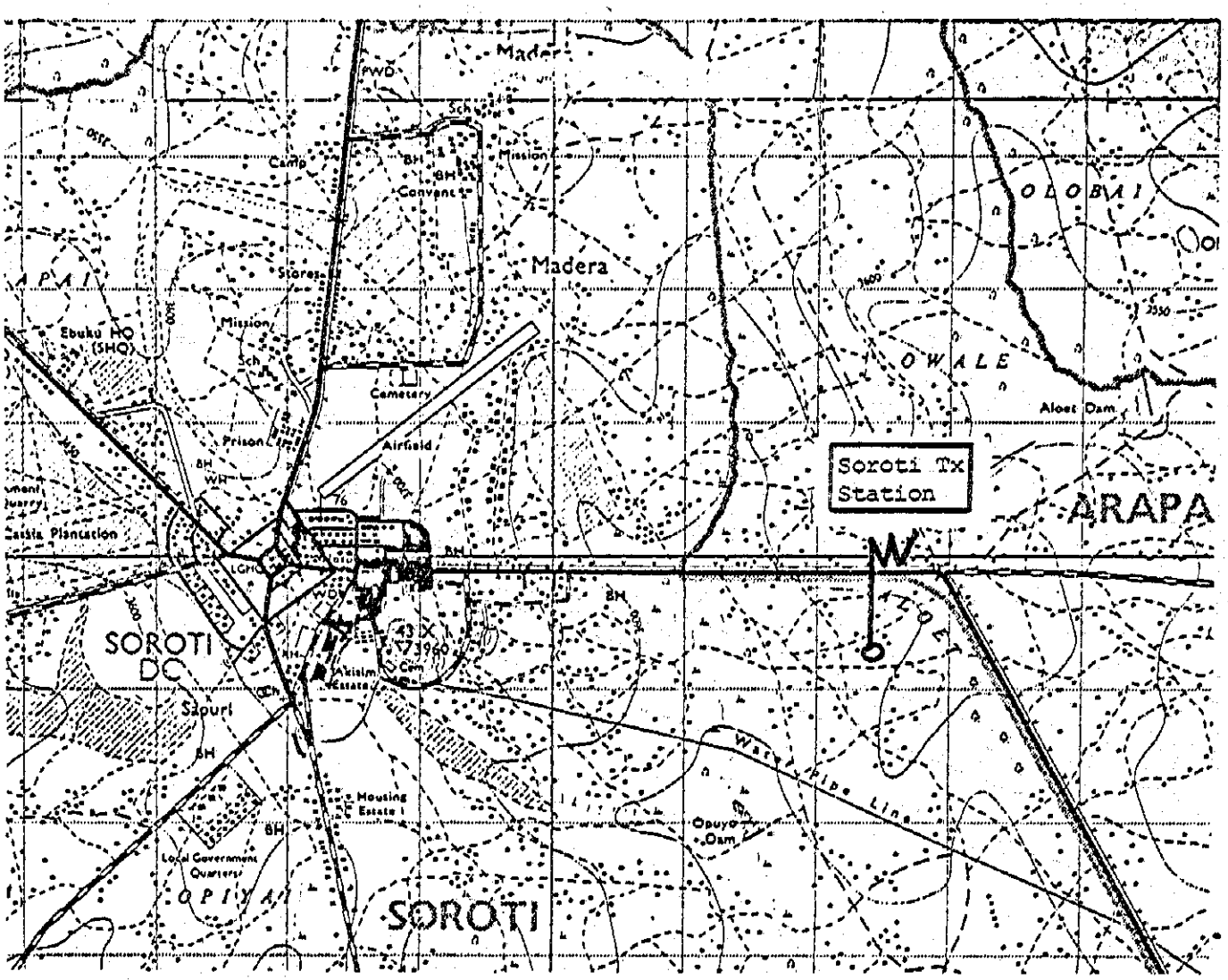


FIG. 17 Location of Soroti Station



N E	01°42'47" 33°39'03"
Altitude	1,100 m
Map No.	43-3 43-1

FIG. 18 Site Plan of Soroti Transmitting Station

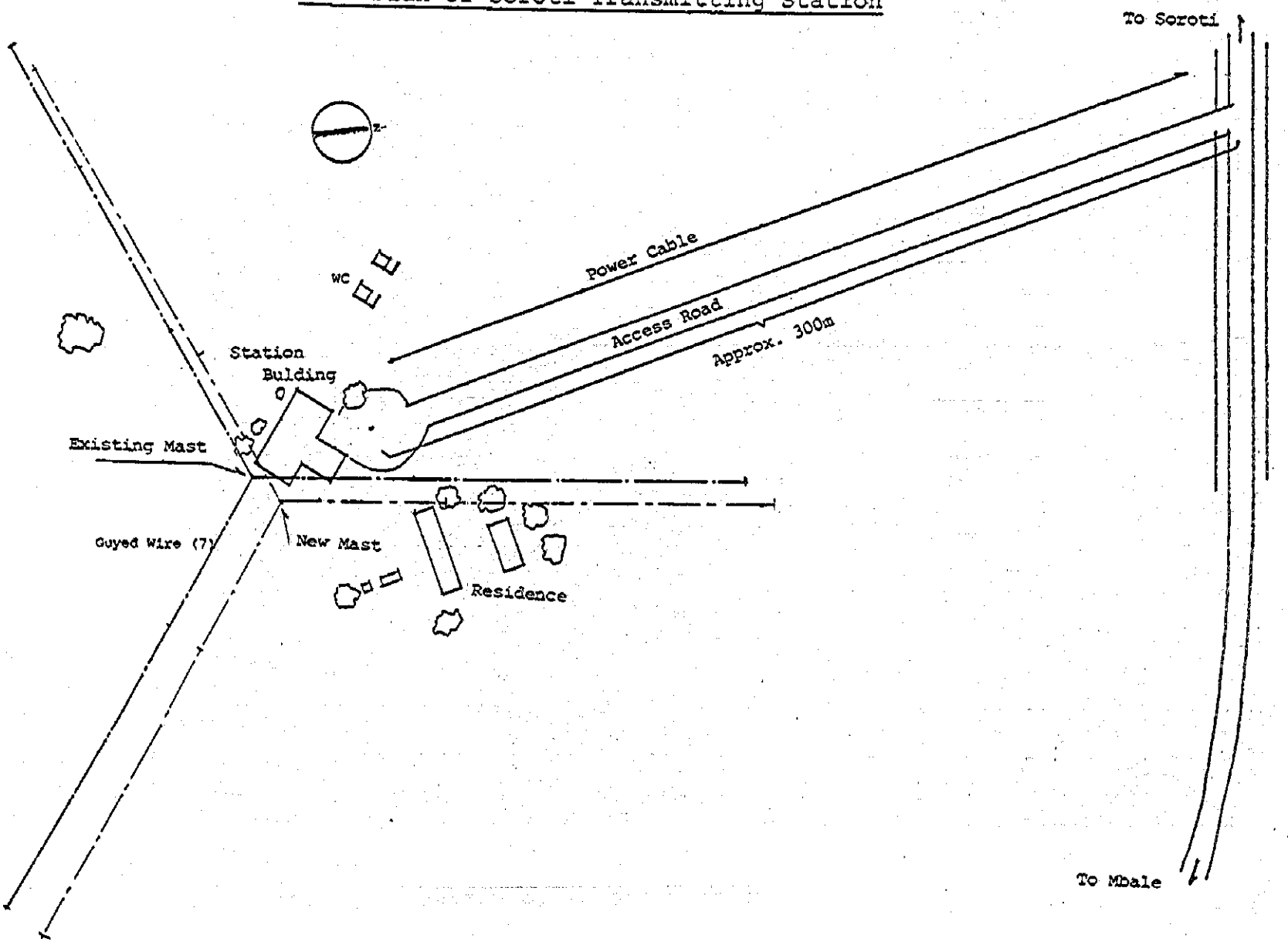


FIG. 19 Floor Plan of Soroti Transmitting Station

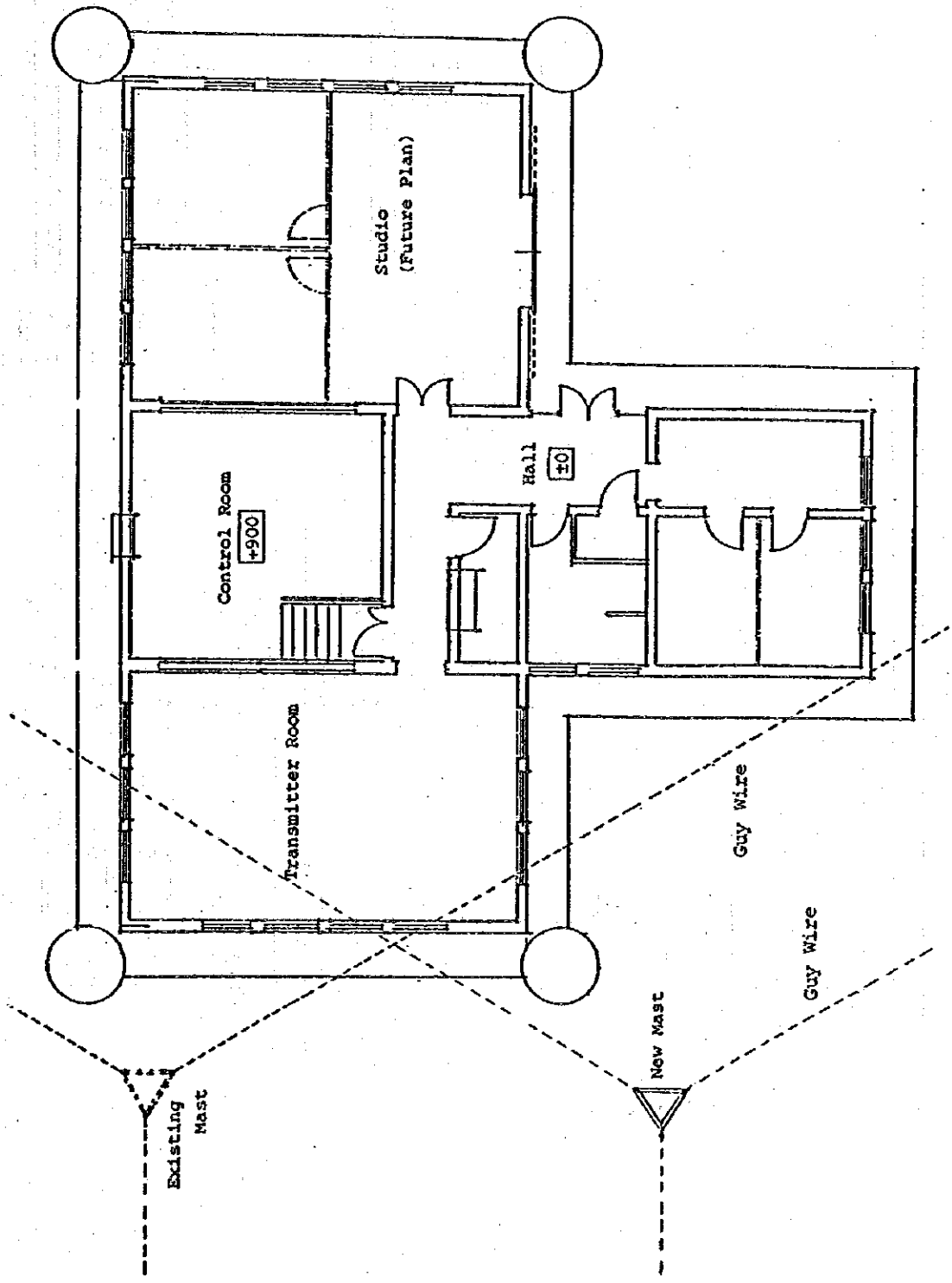


FIG. 20 Floor Layout of Transmitting Facilities in Soroti Station (1)

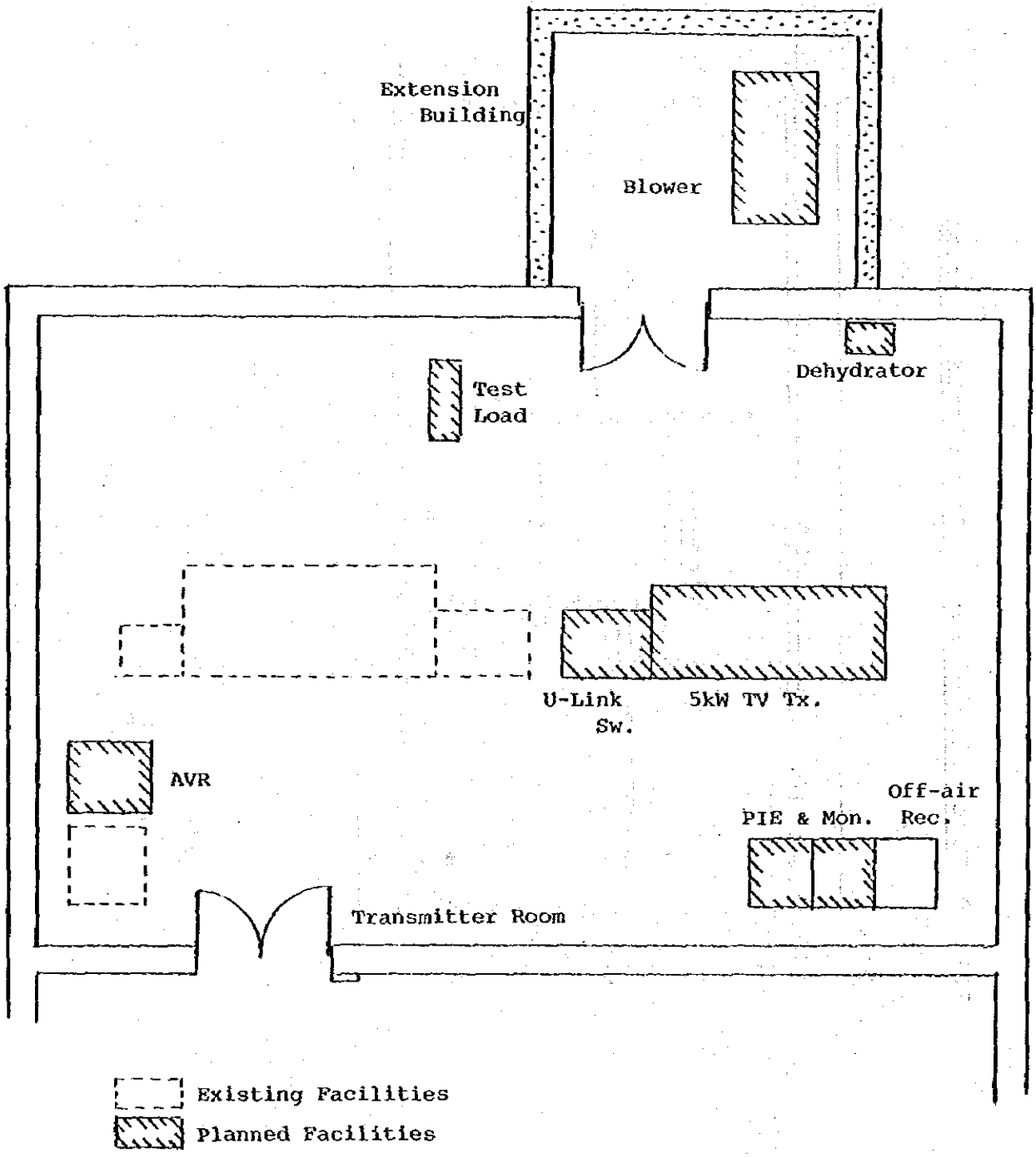
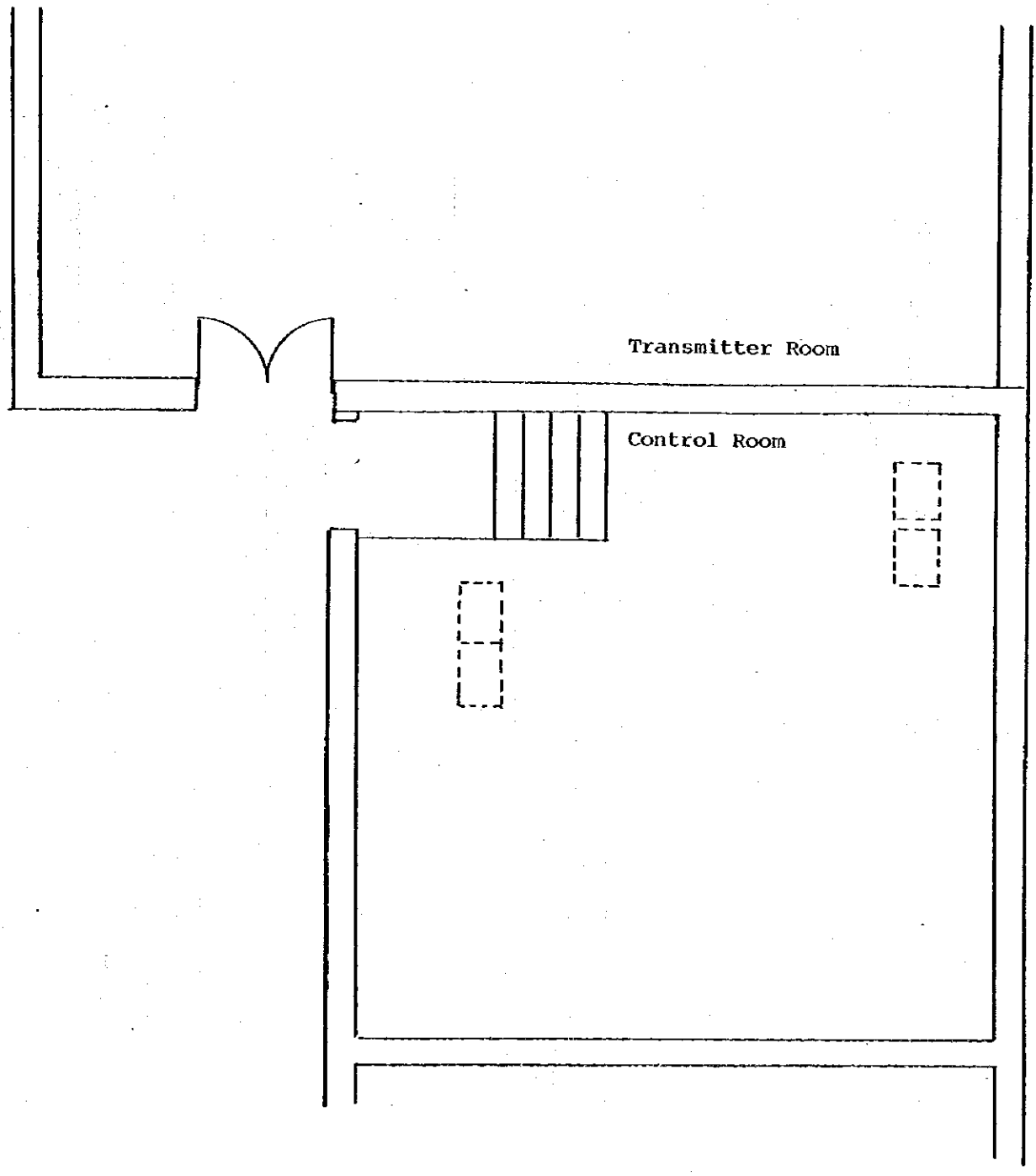


FIG. 21 Floor Layout of Transmitting Facilities in Soroti Station (2)



Existing Facilities

FIG. 22 Block Diagram of TV Transmitting System in Soroti Station

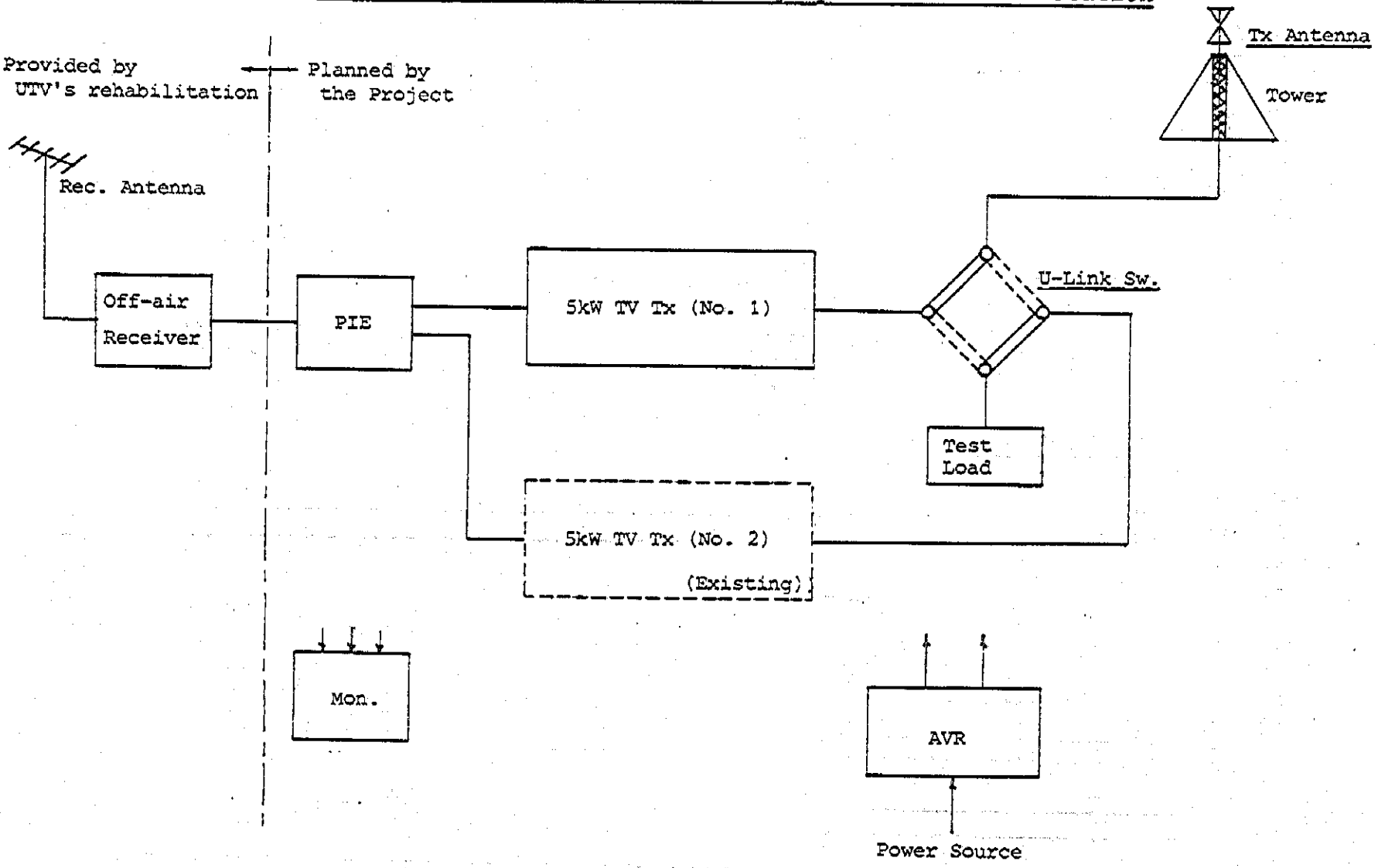


FIG. 23 Guyed Tower for Soroti Transmitting Station

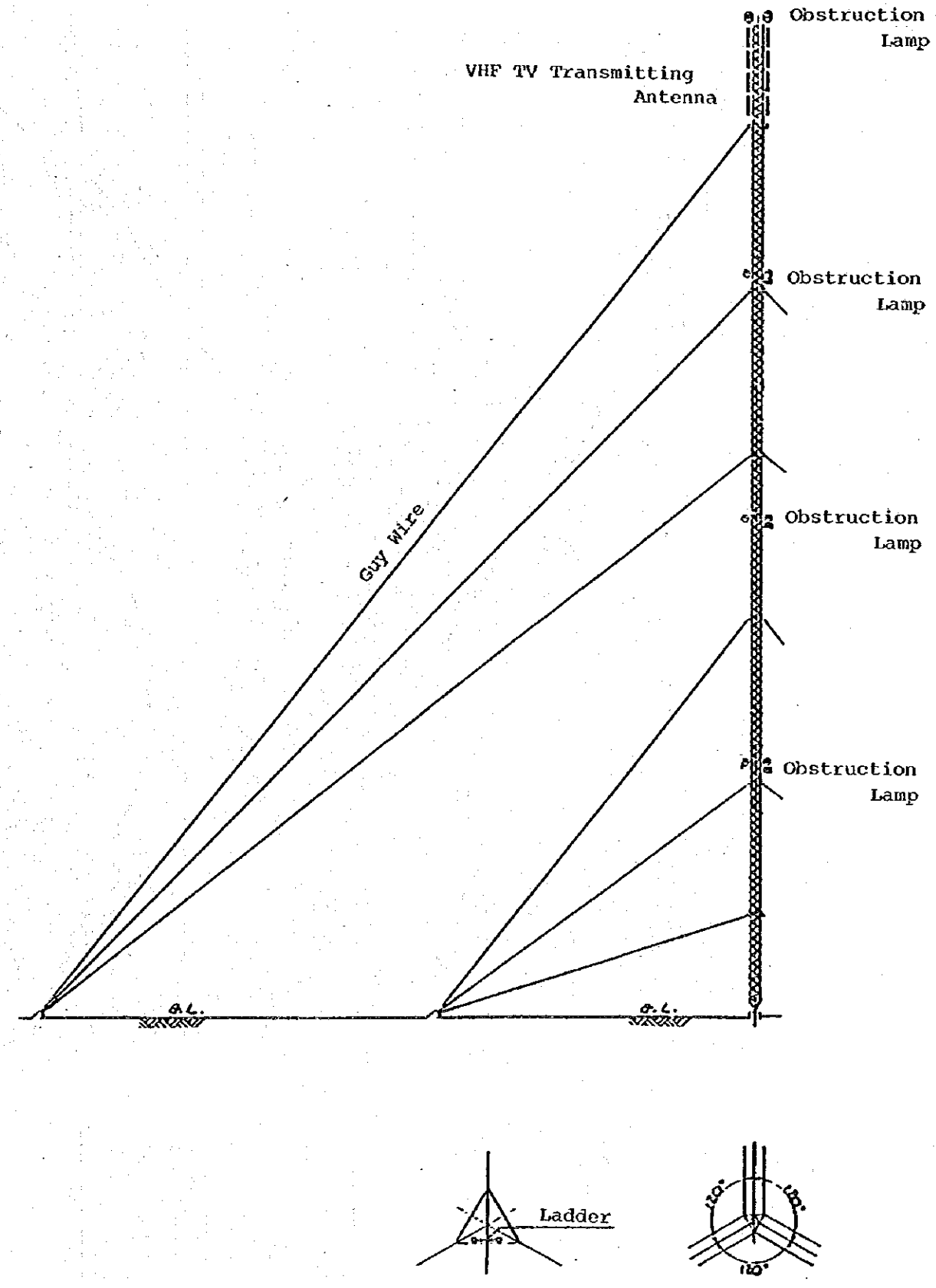
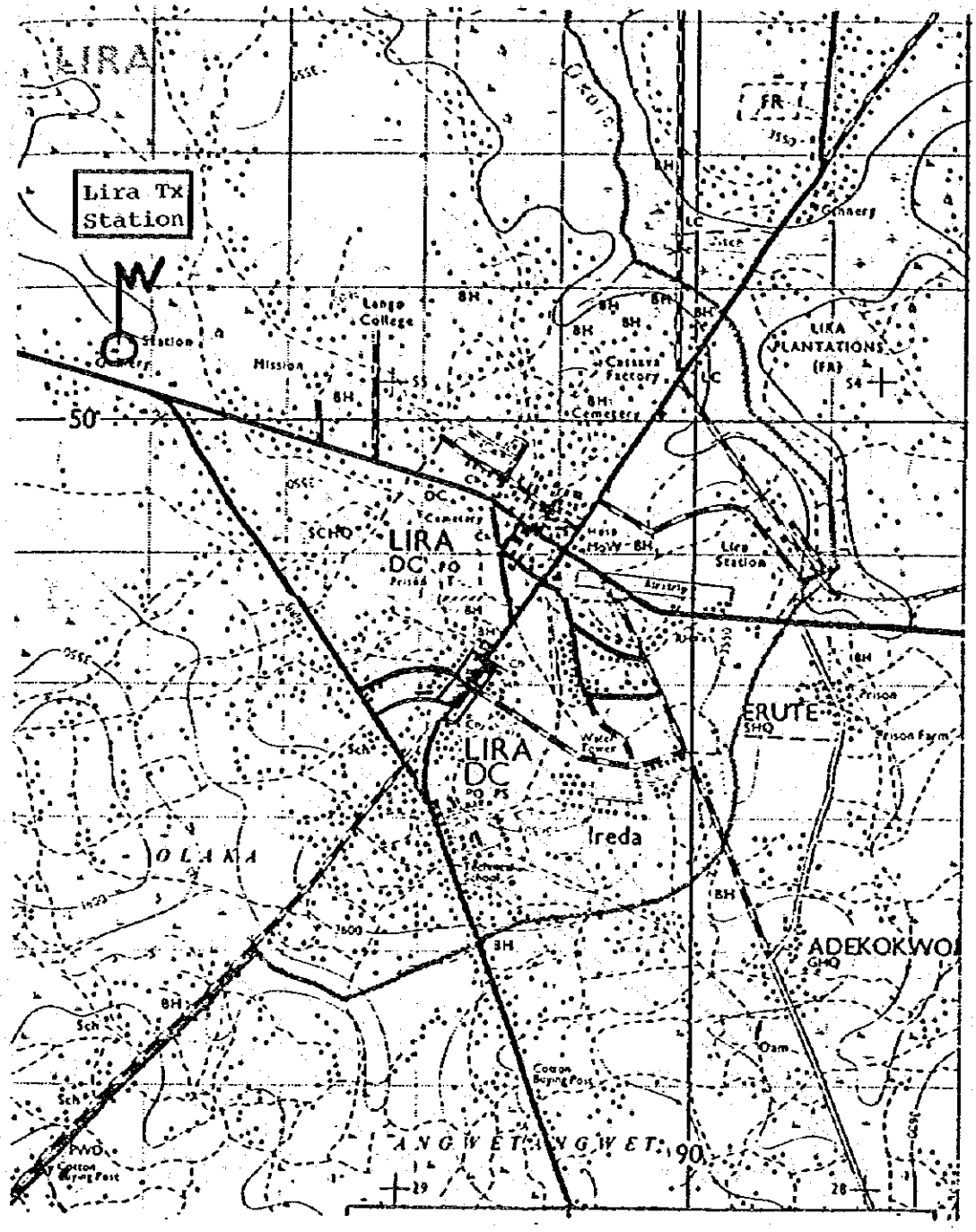


FIG. 24 Location of Lira Station



N E	02°16'00" 32°52'19"
Altitude	1,080 m
Map No.	32-2 32-4

FIG. 25 Site Plan of Lira Transmitting Station

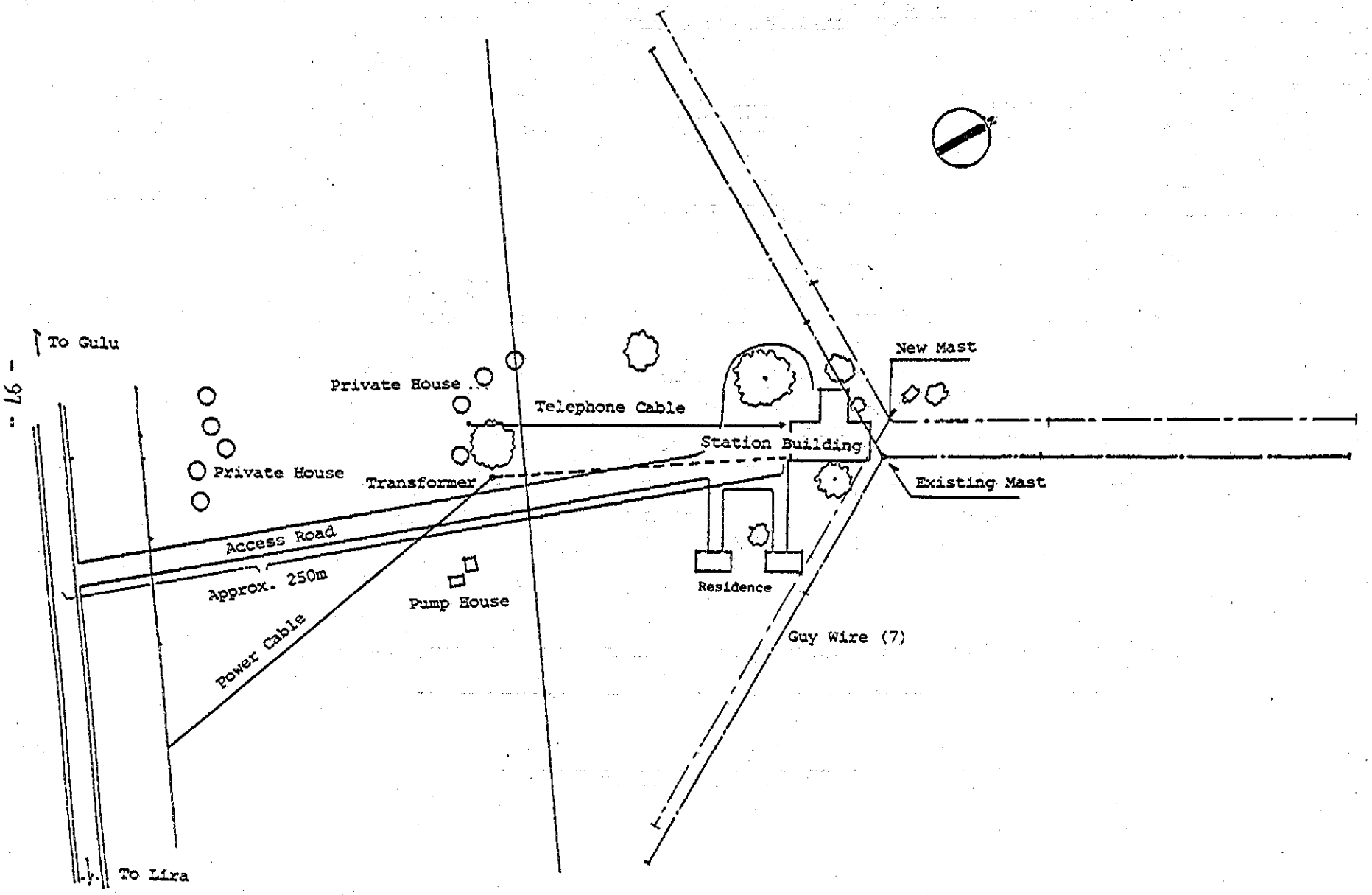


FIG. 26 Floor Plan of Lira Transmitting Station

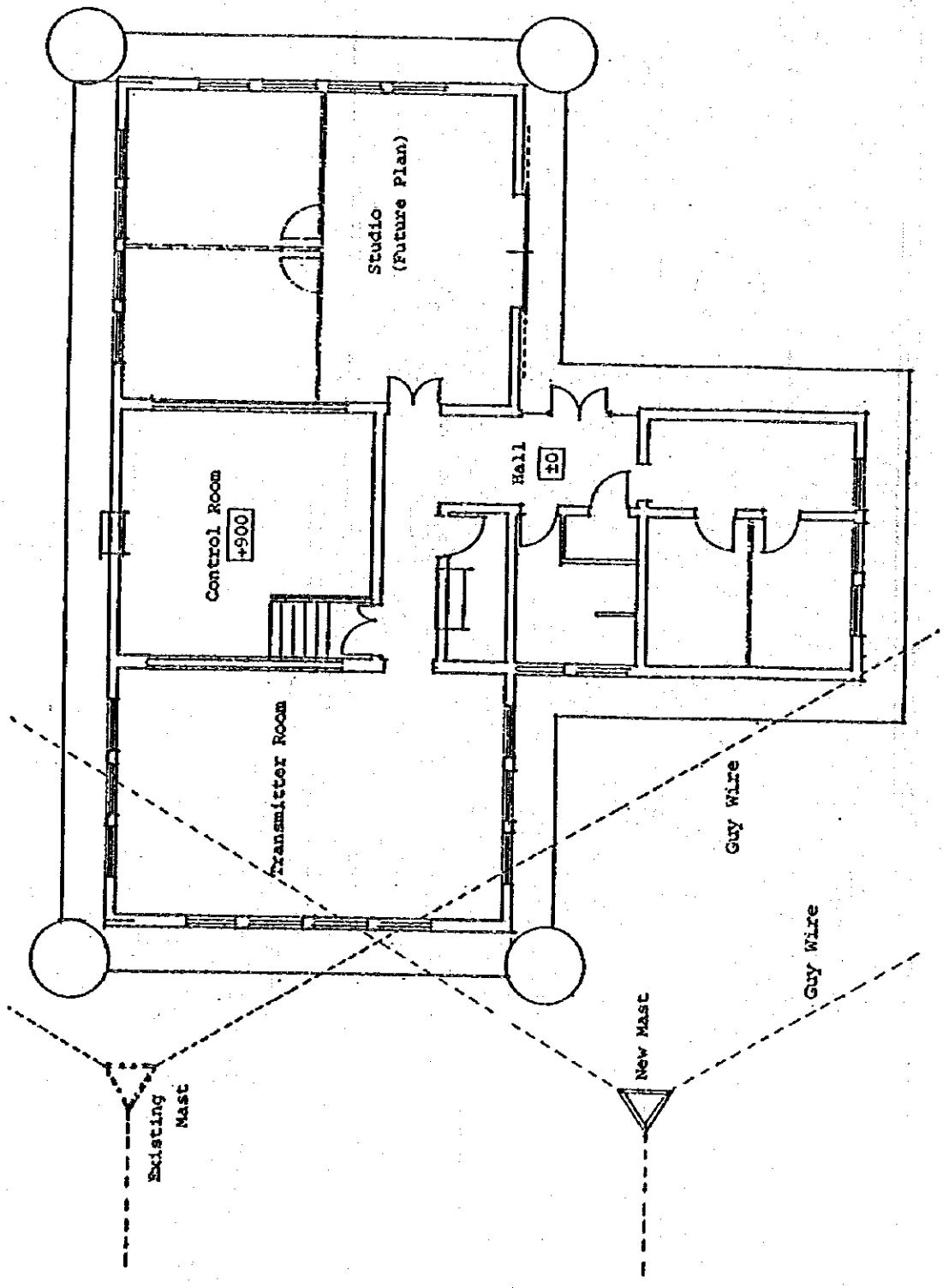


FIG. 27 Block Diagram of TV TRansmitting System in Lira Station

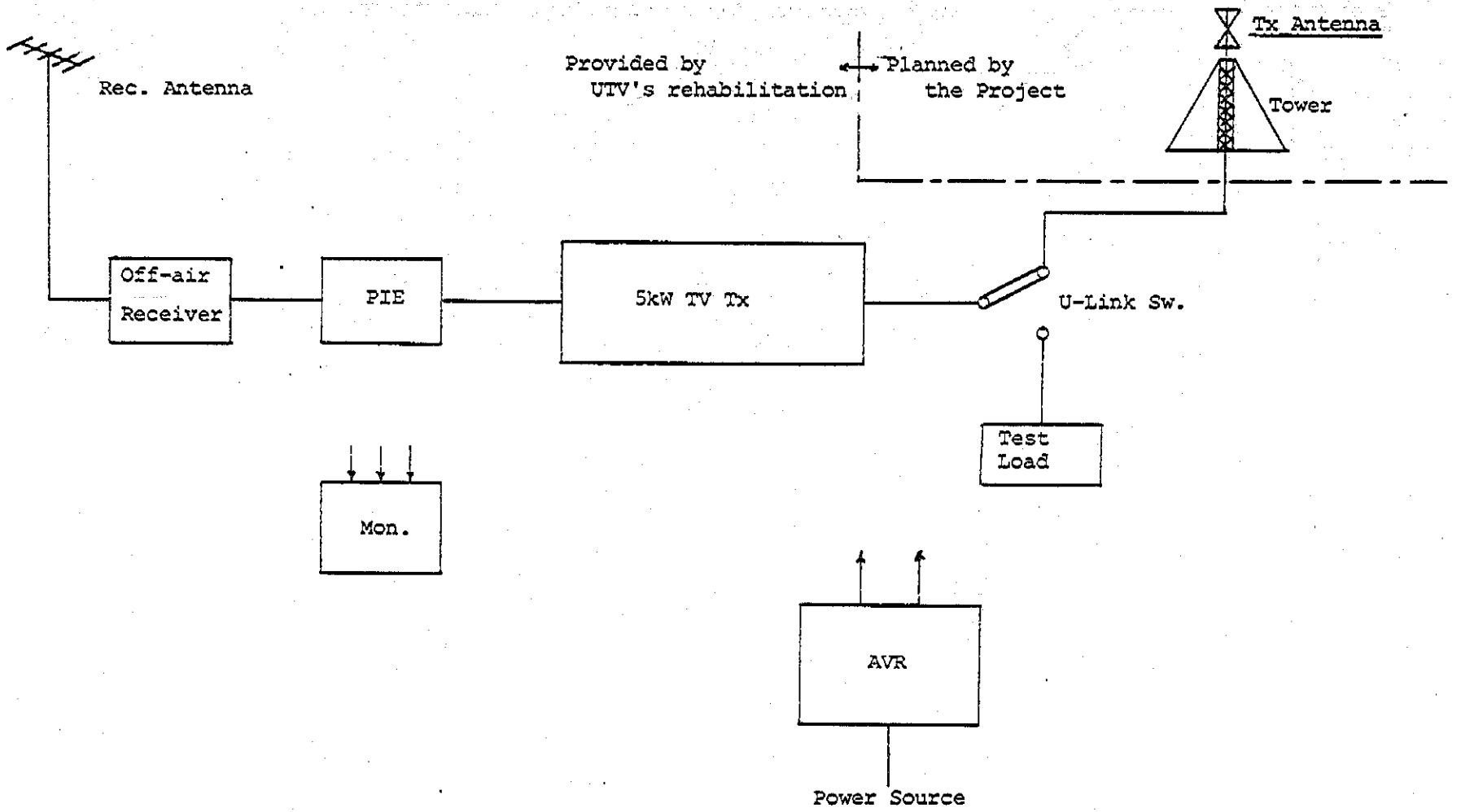


FIG. 28 Guyed Tower for Lira Transmitting Station

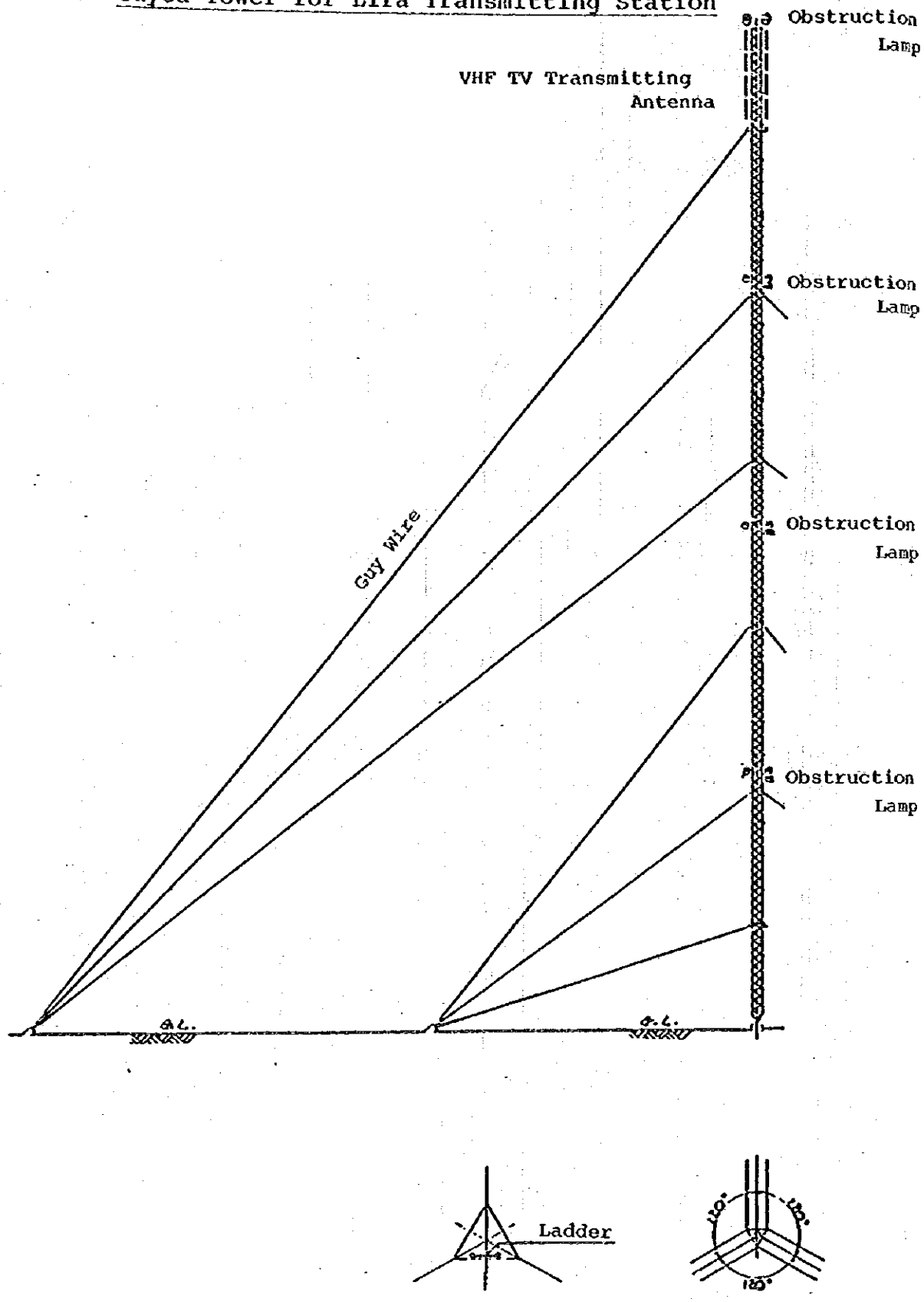
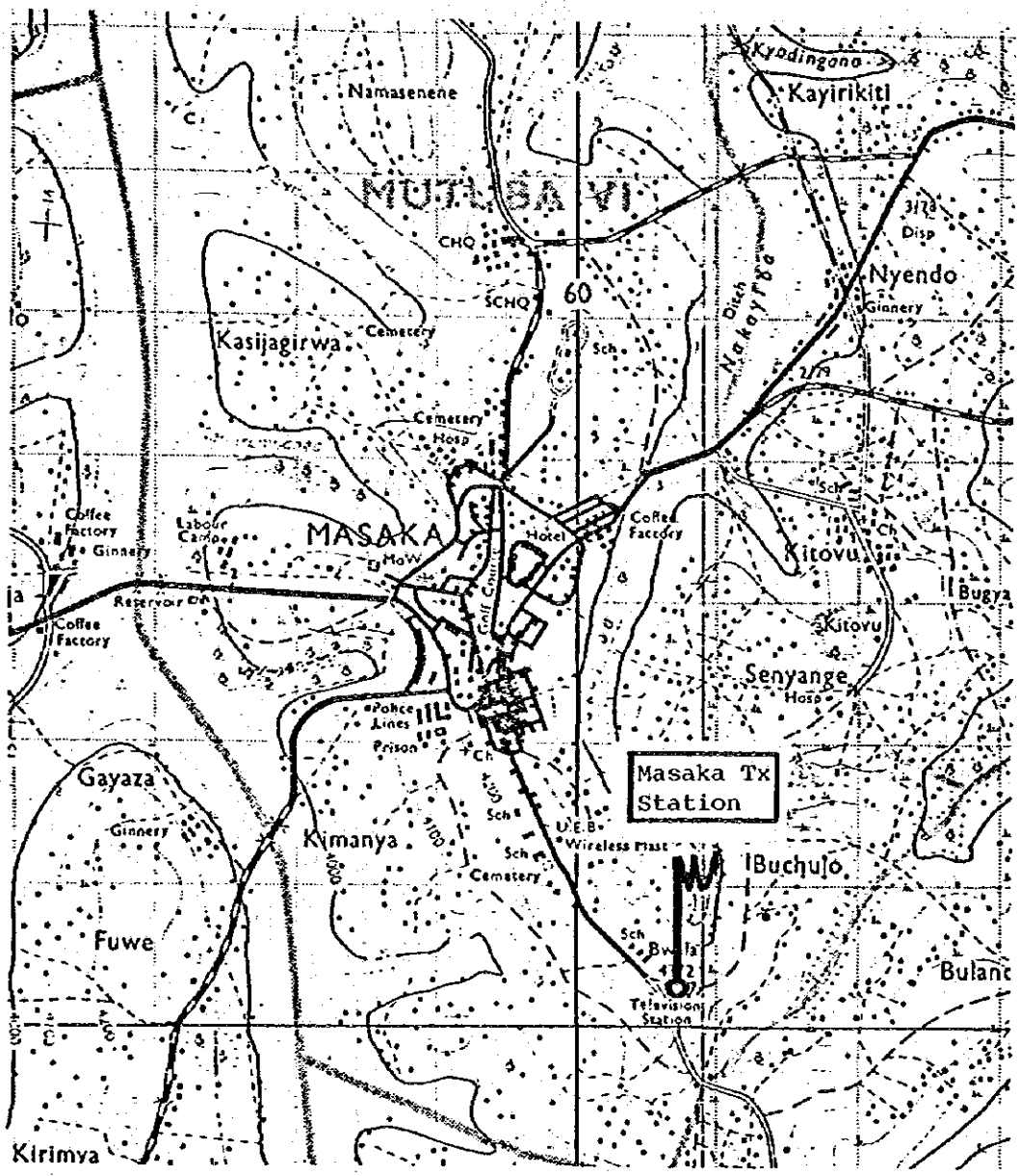


FIG. 29 Location of Masaka Station



S E	00°21'34" 31°44'51"
Altitude	1,330 m
Map No.	79-3 79-4

FIG. 30 Site Plan of Masaka Transmitting Station

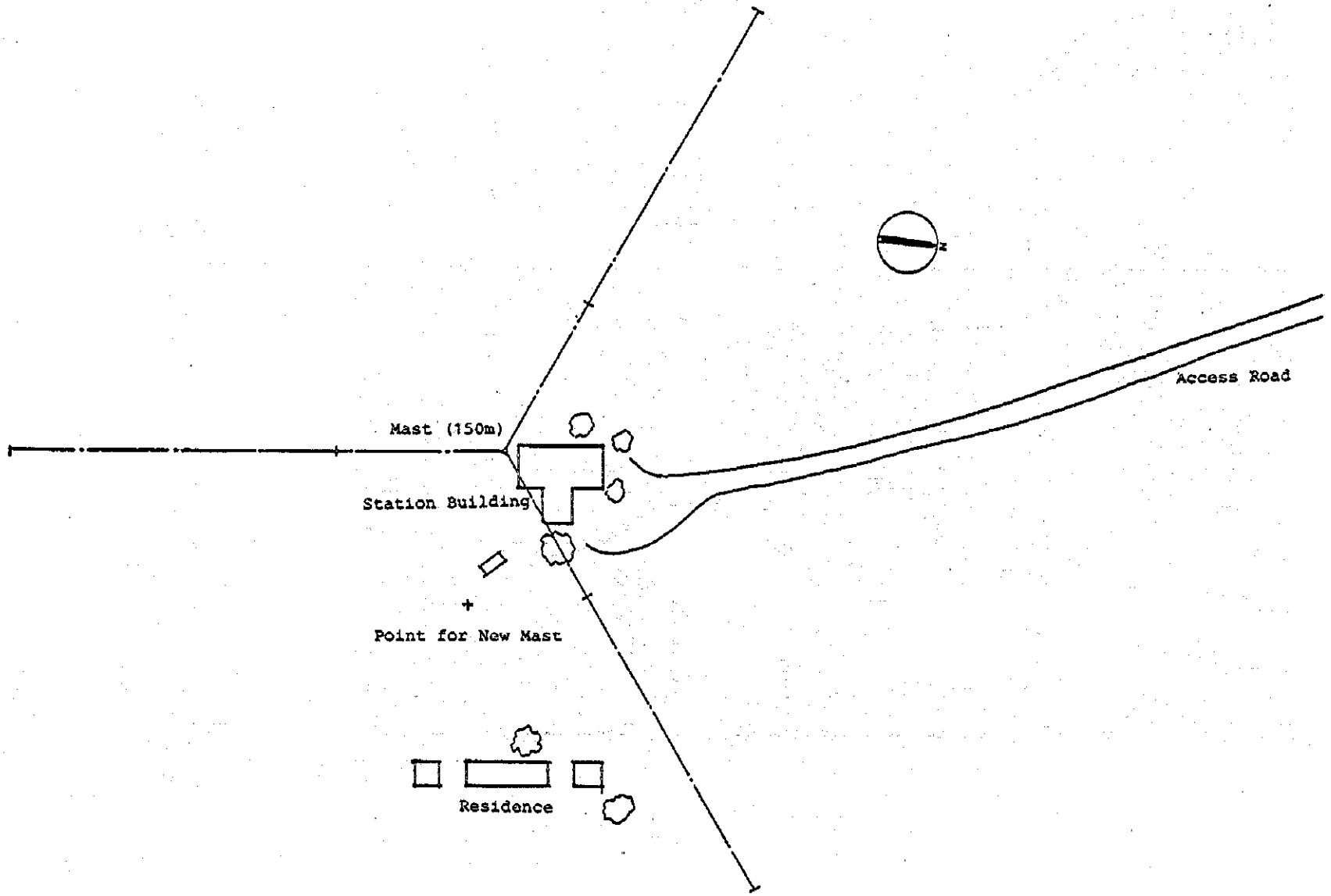


FIG. 31 Floor Layout of Transmitting Facilities in Masaka Station

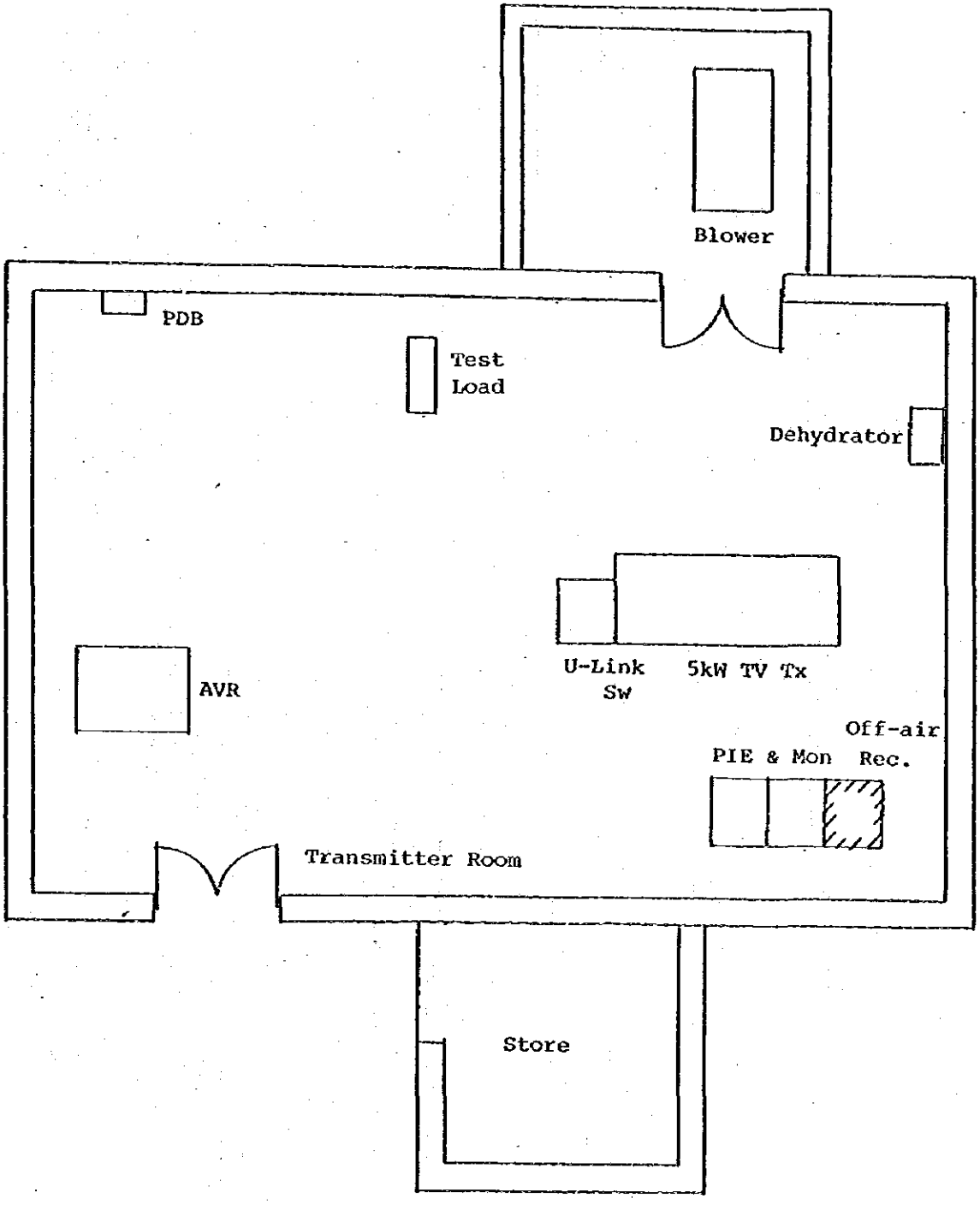


FIG. 32 Block Diagram of TV Transmitting System in Masaka Station

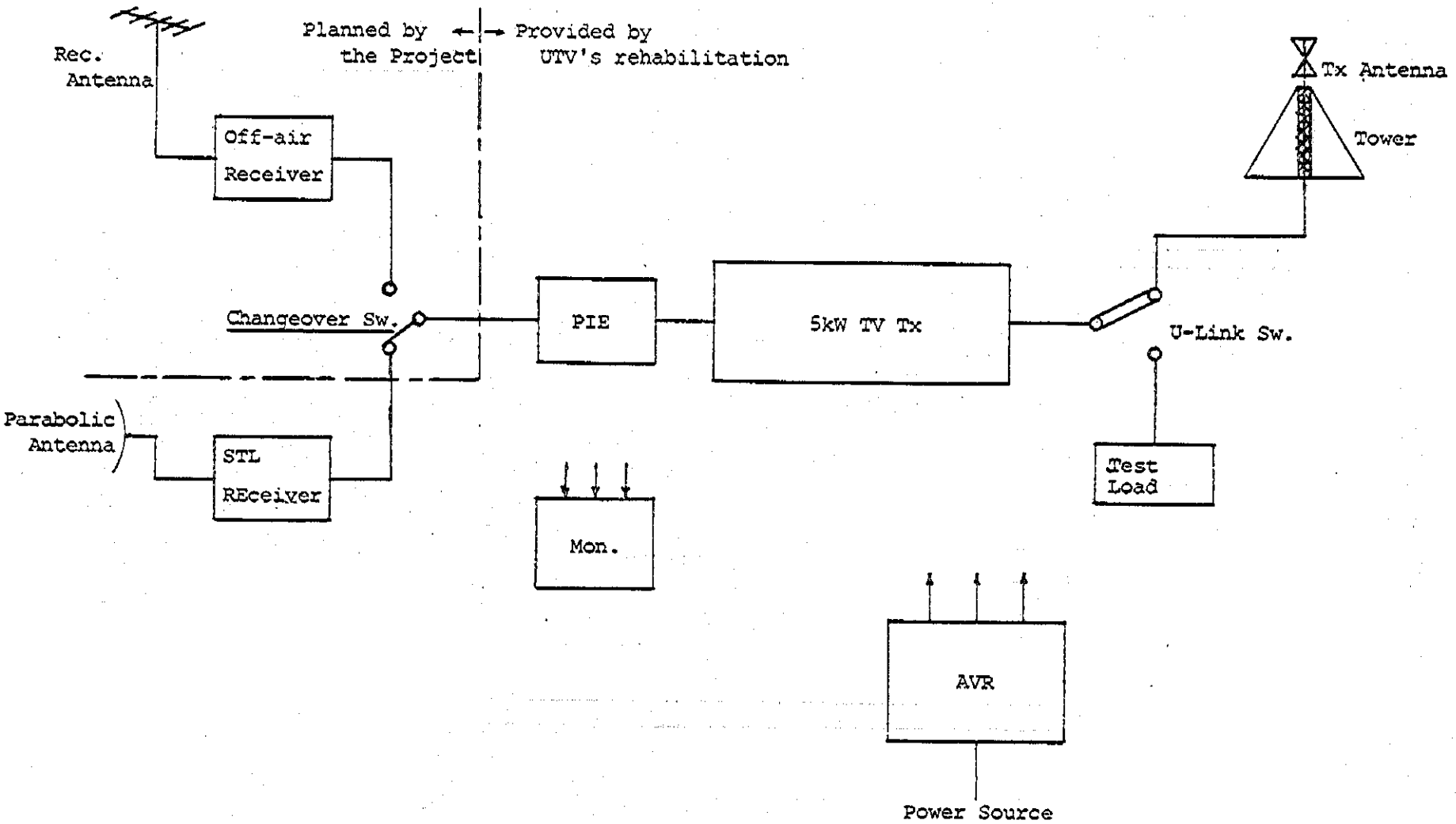
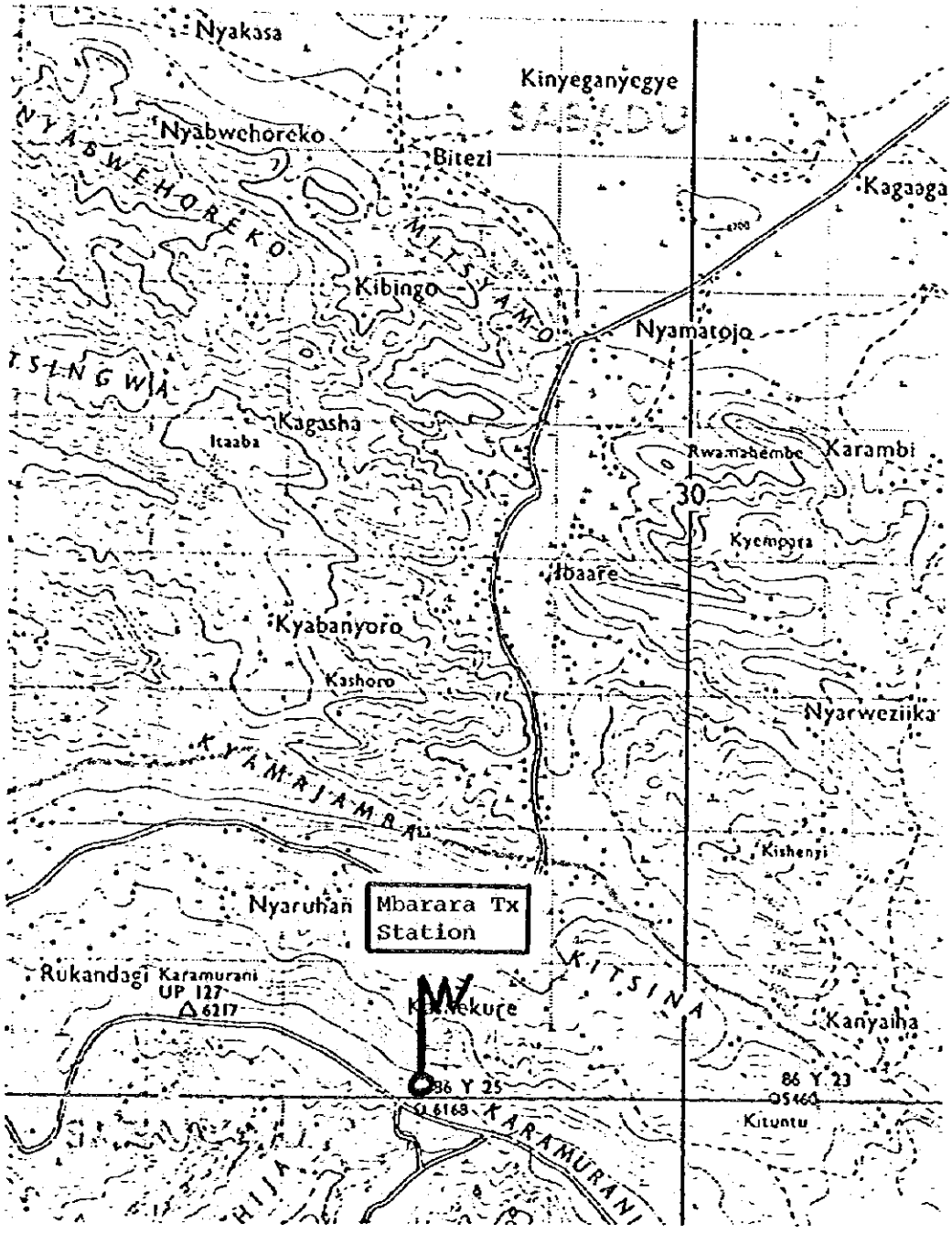


FIG. 33 Location of Mbarara Station



S E	00°43'21" 30°33'24"
Altitude	1,860 m
Map No	86-1 86-3

FIG. 34 Site Plan of Mbarara Transmitting Station

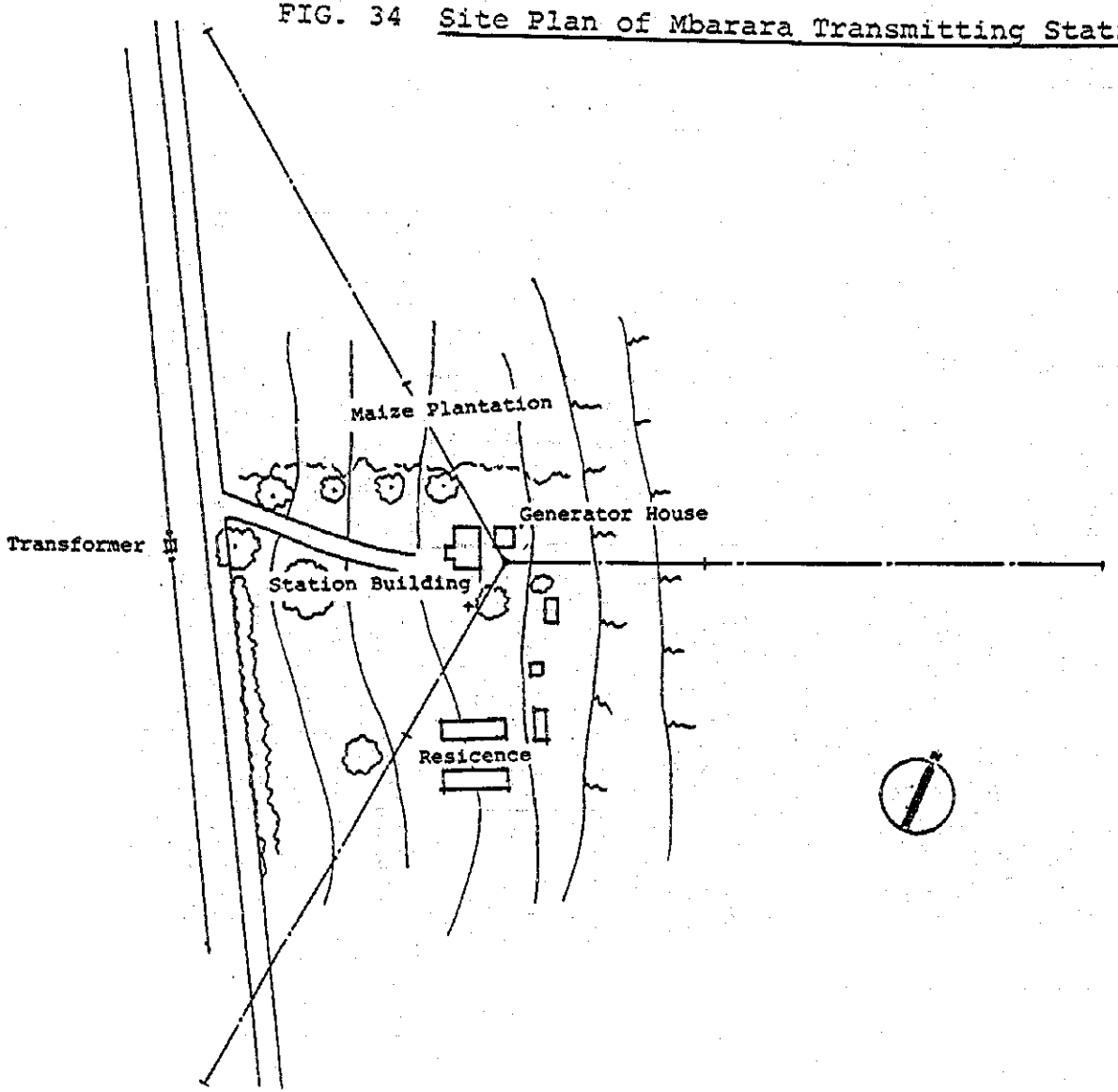


FIG. 35 Floor Layout of Transmitting Facilities in Mbarara Station

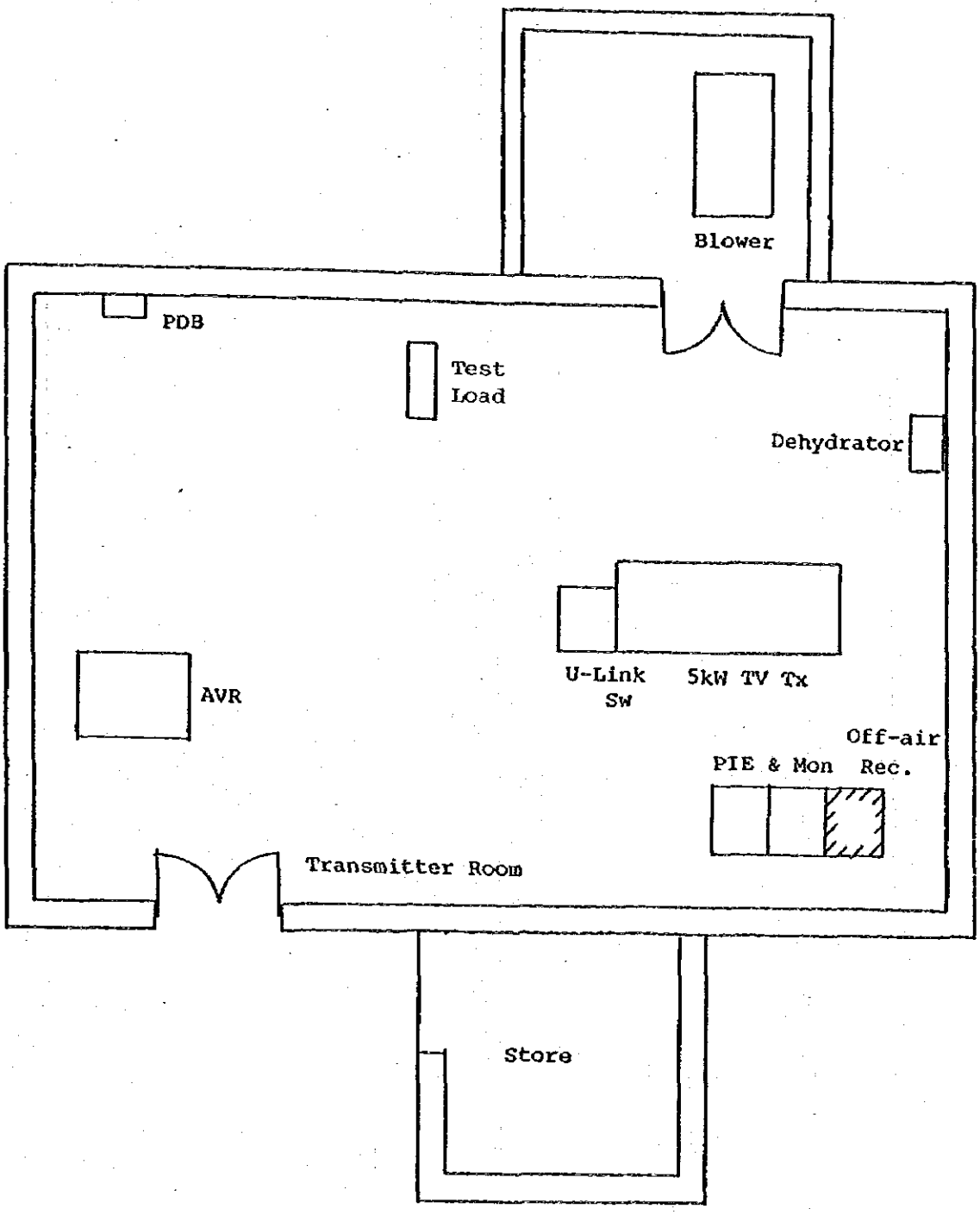
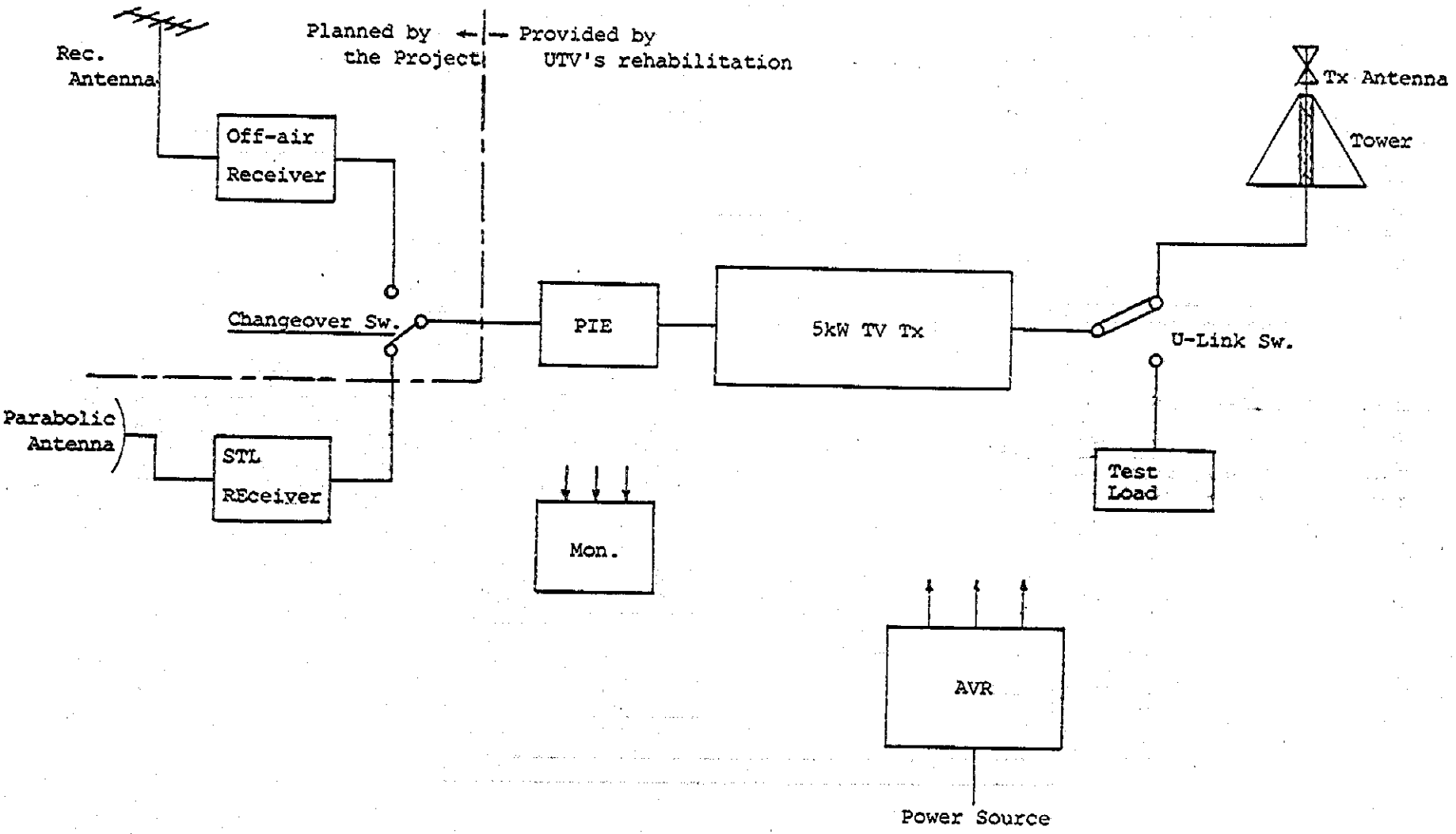


FIG. 36 Block Diagram of TV Transmitting System in Mbarara Station



4-5 Cost Estimation

(1) Construction Cost

Ugandan allotment for this project estimates

Total 170 million USh.

It includes tower foundation, tower erection, antenna installation, withdraw of old equipment, installation of new equipment, and personnel expenses for Ugandan labourer, etc.

Breakdown

1) Tower foundation, tower erection, antenna installation (contracted by UP&T):

165,000,000 USh

2) Withdraw of old transmitting facilities:

560,000 USh

3) Architectural repair of studio structure:

1,455,000 USh

4) Withdraw of old studio facilities:

228,500 USh

5) Installation of equipment (transmitting station and studio complex)):

1,200,000 USh

(2) Operation Expense

The expense of maintenance and administration is generally estimated by the rate of 1% to 3% of the equipment cost. In case of the Project,adopting the rate of 1%, it will be about eight million Yen (18 million USh) in a year.

The consumption of electricity and water supply will be increased by using newly installed equipment. In fiscal 1983, UTV paid about 1,103 thousand Yen (2,428 thousand USh). As it is supposed that the consumption will increase of 20% over before the installation, the charge will be about 1,320.4 thousand Yen (2,913 thousand USh).

CHAPTER 5. EXECUTION SYSTEM

CHAPTER 5 EXECUTION SYSTEM

Whole construction work is carried out by Ugandan side under the supervision of the Japanese contractor. The period of the responsibility of Japanese contractor is until completion of the acceptance test.

5-1 Scope of Work

(1) The scope of works executed by the grant aid of Japan is as follows:

Contractor

a) Manufacturing broadcasting facilities

b) Transportation of broadcasting Facilities from factory in Japan to each site in Uganda

c) Unpacking broadcasting facilities

d) Supervision of installation, wiring and adjustment of broadcasting facilities

Consultant

a) Detail design, tender, approval of drawings and factory inspection

b) Administration of construction on site

(2) The items which are conducted by the government of Uganda in the execution of the project are procedures,civil works and supplementary works shown as follows:

a) procedures related to application, permission, approval to the related Government Agencies in Uganda, necessary to this project

b) procedures concerning customs clearance and exemption from taxation of broadcasting facilities at Tororo (Uganda)

c) installation of necessary infrastructures in each site, such as electricity, water supply, drainage, and communications (telephone and others)

d) foundation works (including materials other than anchor bolts as well as labour cost) and erection work of tower

e) disassembly, removal, after-transaction and arrangement of equipment which are renewed

f) construction of buildings in which facilities and equipment are installed, repair works of them and site preparation

g) construction of access roads to each site (to be completed before the beginning of main works)

h) safe and secure custody of facilities and equipment, supplied by the grant aid project

i) Other expenses necessary for the construction and installation beyond the scope of this grant aid project, are the expenditure of Ugandan Government.

5-2 Executing Body

The executing main body of Uganda is the Ministry of Information and Broadcasting, however a responsible person of the body is the Director of UTV. As a lower branch, several project engineers are appointed, and they take charges of project coordination in practice (in duty).

Engineers in charge are appointed at each station which are being rehabilitated by own budget with Japanese DRG and they are acting now.

These engineers in charge are expected to work together with Japanese contractor's engineers at each site from the beginning of work (after the completion, they take posts of responsible engineers).

It is judged that UTV is pertinent as a practical executing body to take charge of the execution of this project.

Foundation, erection of the tower, mounting of the antenna etc., are conducted by the acting body of UP&T by the contract with the Ministry of Information and Broadcasting.

The acting body of UP&T has already been conducted the construction of tower, mounting of antenna, installation of equipment, for UP&T, and has long experience in it.

Construction machines and instruments were checked by the Japanese team, and they are all judged to be adequate for the installation work of tower, antenna and equipment, planned in this project.

Construction of tower, mounting of antenna and installation of equipment by UTV's own project are also conducted by the acting body, and their experience will be growing.

The control of the implementation schedule is made by Japanese consultant, and the supervision of construction works by Ugandan side and the supply of equipment and materials are done by Japanese contractor under contract.

The detail of execution is specified in the contract document of consultation as well as contract document of the works.

5-3 Implementation Plan

The rehabilitation works in each transmitting station is scheduled to conduct in the order of from Kololo, Soroti to Lira, because the programme is sent by the off-air relay system from Kololo Station to Soroti and Lira, in the north-eastern part. The installation of off-air relay system at Masaka and Mbarara stations will be conducted after the completion of work at Kololo station.

Rehabilitation works in Nakasero Headquarters such as improvement of studio are executed independently from the works in transmitting stations. Sequence of installation is shown below:

1) Air conditioner
2) Studio B lighting system
3) Master control and subcontrol system

5-4 Implementation Schedule

After the conclusion of E/N, 18 months in first term, 14 months in second term each are necessary up to completion and delivery, including the period of detail design.

Table 5-1 shows the implementation schedule for the Project.

5-5 Maintenance and Administration Plan

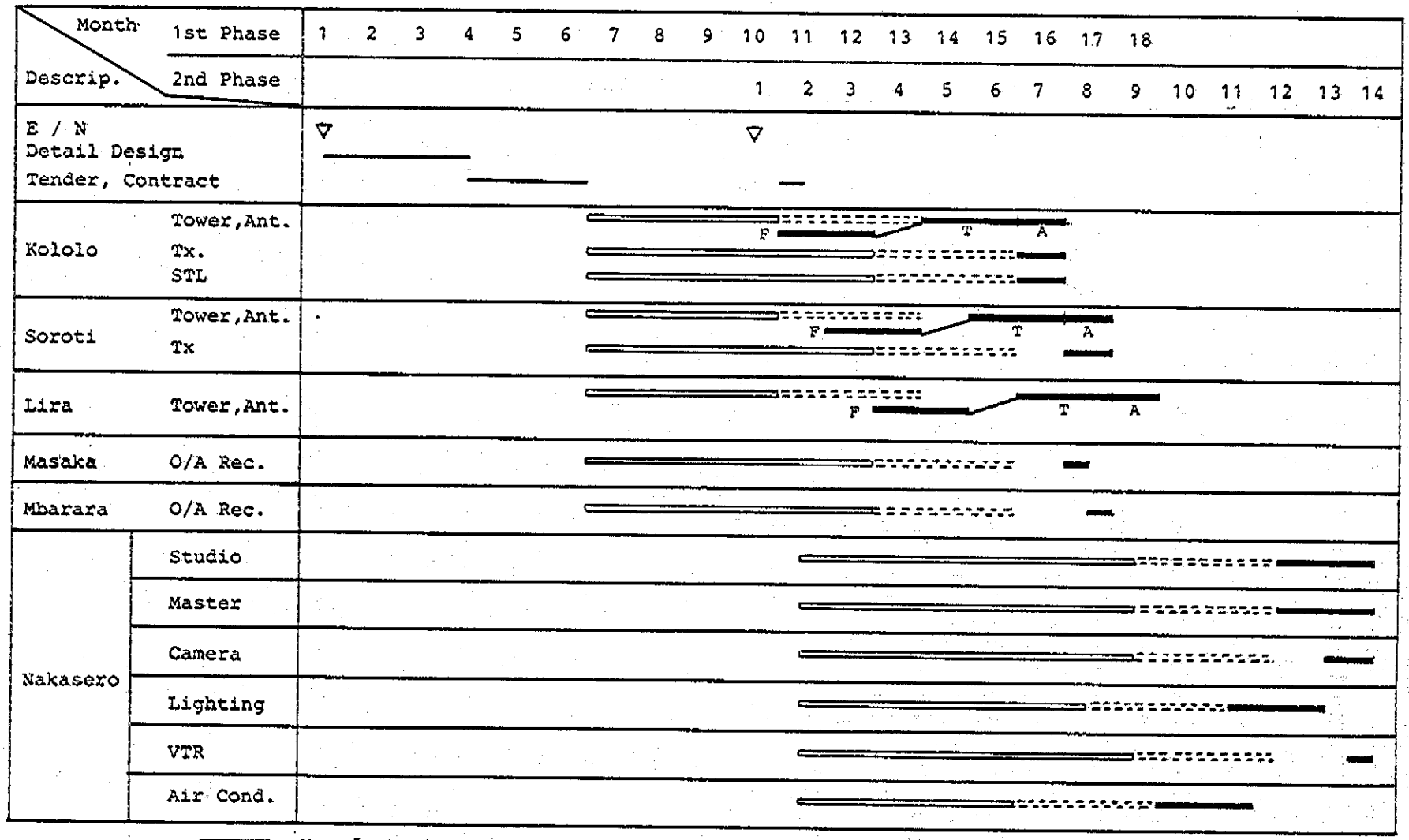
Establishment of maintenance and administration plan is essential to maintain and operate effectively the facilities and equipment which are rehabilitated by the grant aid in good conditions for a long period. UTV is planning to appoint and dispatch a chief engineer not only Kololo transmitting station, but also to each major local transmitting station which is scheduled to be rehabilitated, and is establishing responsibility system. These engineers will be disposed at the beginning of the construction of the project, to take charge in each site on behalf of UTV, and conduct the execution of the project in cooperation with Japanese contractors. After the completion, they are supposed to become the chief engineer of each station. Two to three technicians will support him. For custody of the building, also two to three guardsmen will take charge. (Though local stations has been ceased for its operation more than ten years, the guardsmen have been disposed and taken charge.) At present, staff of Kololo transmitting station is composed one chief engineer, two engineers, four technicians, three guardsmen and two labourers. This staff composition is judged to be enough for daily operation after completion of the Project, and also it is desirable to provide same staff members for each local transmitting station which is rehabilitated by the Project.

As for the studio staff, already enough members are provided not only for Studio David but also for Studio B (28 persons of technical staff and 8 persons of programme director). However, technical staff for Studio David and for Studio B are separately nominated at present. It is desirable to integrate so as to be able to operate both studios by all staff members equally.

The Engineering Department of Kampala Headquarters will organize the whole work and undertake the task of guidance on the maintenance and management under the command of the Director.

Table 5-1 Implementation Schedule for the Rehabilitation of TV Network in Uganda

(Tentative)



CHAPTER 6 PROJECT EVALUATION

CHAPTER 6 PROJECT EVALUATION

Uganda is situated right on the equator, but it is blessed with a mild climate, a proper amount of rainfall and fertile land, and its people are hardworking and intelligent. As a country, therefore, it has a great development potential.

While many African countries are now facing with an acute food shortage, Uganda is one of the few exceptions which are self-sufficient in food. This is a good evidence to show that the country is blessed with favorable natural conditions. It has many lakes including Lake Victoria from which the White Nile issues. The abundance of water resources offer the possibility of hydroelectric power generation, and electricity is actually generated with water flowing down from Lake Victoria, which is partly supplied to Kenya as an important source of the country's foreign currency earnings.

Uganda has thus tremendous human and natural resources development potential. However, the revolution war in the 1970s destructed many buildings and facilities, leaving the people for years. The country's rehabilitation has just begun to be undertaken after the lapse of several years since the close of the revolution war. Infrastructural facilities are not operated properly because they have been left virtually intact from the early 1970s up to the present time.

Nearly all communications facilities such as TV, radio and telephone still remain in difficult state, although these constitute the central nervous system of the country. People in rural areas are therefore deprived of all means of communication excepting the word-of-mouth communication by which they obtain fragments of information about the situation in Kampala and neighboring towns. Interviews with district commissioners visited during the team's field survey of local TV stations disclosed that they were unanimous in hoping for the reopening of TV broadcasting service in the near future.

The Ugandan people are keenly aware of the importance of school education. Schools are found everywhere in the country, not just in the

capital city of Kampala (the primary school attendance rate is estimated at about 50%). However, the contents of school education are not very satisfactory owing to the shortage of teachers and teaching materials. Telecasting of school broadcasting programmes will serve as an effective means of upgrading the present level of school education. For example, if any single capable teacher appears on TV for a school broadcasting programme, he can be viewed by all schoolchildren across the country, and this will produce an immense education effect. Science lessons, in particular, will prove especially effective if given on TV which can present " something that has to be seen to be believed."

When TV broadcasting facilities reconsolidated under the project, the coverage will rise to more than 65% of total population and the Kampala Station's Studio B will be put into use as a programme planning/production centre. Availability of the Studio B's facilities will also make it possible for the UTV to broadcast an increased number of programmes planned and produced on its own to better meet the demands of Ugandan viewers.

In addition, school broadcasting programmes currently broadcast irregularly during the time zone of 13:00 - 16:00 hours will eventually turn to regular broadcasting service, and the programme quality level will be upgraded greatly because a longer time than allowed at present can be spent for producing each individual programme and also because the additional installation of several sets of ENG will widen the field coverage of news and materials.

School broadcasting programmes can be rebroadcast more frequently than other programmes because each of them is often put on the air two or three times in a week and can also be used after a year according to the curriculum of each grade. Accordingly, when the number of programmes is increased to a certain extent, it will become possible to realize regular daily broadcasting of about two hours using four or five programmes each day including those procured from abroad.

The planned coverage increase from the present 8% to more than 65% will result in a sharp increase of the viewer population, which will interact with the above mentioned programme quality improvement and air

time extension to produce a phenomenal effect in upgrading the level of school education.

A similar promotional effect can be foreseen for social educational programmes which will be produced mainly for dissemination of health and hygiene knowledge, presentation of traditional tribal dances and songs, extension of advanced farming techniques among farmers who account for 95% of total population, and weather forecasting service.

Presentation of entertainment programmes is another important function of TV broadcasting service. These programmes will undoubtedly be accepted with an enthusiastic welcome especially by the viewers in farming villages where the life is simple and monotonous.

Broadcasting service exhibits its functions only when it has receivers. The spread of TV sets is an essential precondition for attaining education effects by augmented TV broadcasting service.

In Uganda, TV sets are supplied mainly by the International TV Set Sales Corporation (ITS) which has sold more than 100,000 sets between 1963 and 1980. It is also known about 5,000 sets have been sold in the Ugandan TV market since the close of the revolution war.

Although TV broadcasting service now covers the two cities of Kampala and Jinja and surrounding areas, it is believed that there are about 50,000 - 60,000 sets in the country because many people owned TV receivers in areas covered by TV service in the 1960s. However, it is not easy for most Ugandan families to buy a colour TV set individually for their own use because a 14" colour TV set is priced at as high as ¥150,000, while the average income in a month of government officials ranges from ¥4,000 to ¥5,000. This means that TV sets need to be installed at social centres, schools, public assembly halls, etc. where the people can gather together to watch TV. For this purpose, the UTV is making positive approaches to the ITS for preferential distribution of TV sets to schools and public facilities.

In a country like Uganda which has high development potential of human and natural resources, actualization of such potential is an important key to its national growth and prosperity. Particularly important is the human resources development, school education and school broadcasting programmes are the basic and indispensable means of realizing it.

Augmentation of school broadcasting service calls for service area extension by the TV network expansion and programme quality upgrading, and these two requirements can be met fully by the TV network development and studio facilities improvement under the project.

The Ugandan Government is now carrying out a number of projects formulated to develop the country's growth potential and build up its national power by reinvigorating the people and by rehabilitating all damaged facilities. The TV network rehabilitation project to be financed by the Japanese grant aid is given top priority among all these national rehabilitation projects, and its implementation is expected to produce a magnificent effect in promoting Uganda's school and social education, in improving social life and welfare, in inducing everyone to know and understand the government policies, in disseminating the official language and in enhancing the moves for national unity. Thus, it is expected to work as a powerful driving force for accelerating the growth of Uganda to and beyond the level recorded in the "Golden Years of the 1960s."

The UTV's staff is making strenuous efforts to produce high-quality programmes. Judging from their organization and experience, it can be said that they competent for it will be encountered in the operation or maintenance of the newly installed broadcasting facilities.

The project implementation with Japan's grant aid can evaluated as highly justifiable as it will produce immense cooperation effects for the Ugandan people.

CHAPTER 7. CONCLUSIONS AND RECOMMENDATIONS

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7-1 Conclusions

In formulating its TV network rehabilitation plan to raise the coverage to the 65% level maintained in the "glorious 1960s," the Ugandan Government paid special attention to the visual educational effect of TV broadcasting service, regarding it as a powerful tool for removing the mental and material marks left by the revolution war of the 1970s. This judgment of the ugandan Government can be evaluated as quite reasonable in the light of the bitter past experience the country was forced to undergo.

The growth of any country depends on its people, and the success of human resources development is a decisive factor in securing a bright future for that country.

Promotion of school and adult education and enhancement of human resources development, both planned to make maximum use of the potential capacities of the Ugandan people and Uganda's natural resources, are therefore the basic and most important policies to be pursued for the country's future development. TV broadcasting service for promoting school and social education is one of the most effective means of materializing these policies.

Needless to say, TV broadcasting service is not just effective in promoting education, but it is also highly instrumental in making all people know and understand the government policies, in improving the people's health and welfare, in stimulating the use of the official language, in realizing a close bond of inter-tribal communication, and in offering entertainment for the people.

From the above point of view, Japan's cooperation in the project by offering grant aid can be evaluated as highly effective and contributory to the future national development of Uganda.

7-2 Recommendations

An adequate maintenance system should be established to assure that the new TV broadcasting facilities to be introduced under the project will be maintained in perfect service condition for many years to come.

The UTV has assigned a number of chief engineers to respective transmitting stations to set up a facilities maintenance and management system. These engineers need to be given training in Japan and Uganda because they seem to lack in the technical experience required for fault-free operation and maintenance of the new facilities.

The Ugandan Government is hoping strongly for Japan's assistance in training these engineers in Japan and Uganda during the project period, and is eager to secure the services of Japanese experts to be dispatched to Uganda on a long-term basis. In connection with the expert dispatch service, the team advised the competent Ugandan authorities to forward a formal request for assistance through the normal diplomatic channel (e.g., via the Japanese Embassy in Nairobi).

The Ugandan side will carry out such work as the tower foundation work and erection, antenna installation and equipment installation under the guidance of a Japanese field supervisor. In order for these works to be completed in time, the Ugandan side is urged to exercise special care and the Japanese side should also pay careful attention in schedule control.

The project will be implemented to complete only the arterial development under Uganda's TV broadcasting development scheme. Further expansion of the UTV's TV network calls for the development/improvement of other local stations (transmitting stations, studios, etc.). For this purpose, it is hoped that the TV network development will be continued in the future in parallel with the construction of the microwave circuit network.