

4.4 Implementation Plan

4.4.1 Implementation Policy

Implementation plan for the project shall be established with the objective of radar system operation only and other implementation programs such as building construction for radar operation and/or equipment installation shall be controlled under the project objective.

Thus, the implementation plan should be established to allow full performance of the radar system in the final stage of the program.

In order that, the implementation plan, which consists of small term programs individually, should be combined and controlled in terms of the overall program control based on radar operation.

To achieve the policy, the following requirements should be taken into account in the planning and implementation plan:

- The radar equipment manufacture and installation work will require the longest working period among the other work items on the project implementation program. Thus, the radar equipment implementation program shall be specified as the critical item on the implementation schedule and shall control progress of the work with special attention paid to it.

The detail implementation schedule will be required to control and monitor the critical items of each stage, such as systems design, manufacture, installation, commissioning, inspection and testing.

The implementation schedule of other facilities will be arranged keeping coordination with the critical item executing schedule, and will be combined with the master schedule step-by-step.

- Most of the assembly module, parts and materials which consist of equipment are manufactured individually with special design and production control, and will take a long period for transportation to Nepal.

For this reason, careful handling and management will be required for handling of the equipment.

In case equipment failure turns up on the equipment quality, the accident will affect the overall implementation schedule.

- Some of the construction sites located in the airport, and interconnection work with existing ATC equipment will be carried out during the airport operations. The most attention shall be provided for close coordination with airport operation staff in order to avoid confusion, and allow practical airport operation.
- The construction field work is specified in two categories, such as architectural, civil engineering, building facilities, and radar equipment manufacture, installation, testing. A large amount of coordination activities concerning radar equipment installation, operation and maintenance will be required with the building construction work.

Since civil and architectural work will precede the equipment installation work, close coordination will be required to ensure that both schedules will implement each other.

4.4.2 Construction Condition

There are no significant problems in the construction works of this project. Since the construction sites are located within the property of DCA, land acquisition is not required. Therefore, it is considered that there will be no serious problems to affect the construction schedule.

Among the four construction sites, two sites are located within the Airport and the other two are outside of the Airport. Since the road conditions to each site are generally poor except the operation building site, four-wheel drive vehicles must be used for access to the sites. In the rainy season, the road is often flooded and damaged in many places even by light rain. Geological conditions are generally unstable.

4.4.3 Implementation Method

A number of factors should be considered to establish implementation plan for this project. Particularly, coordination activities between different construction fields are essential. Construction stage will be phased for the equipment manufacture stage and field construction stage. Detailed Design will be carried out before the construction stage. Commissioning test including flight check will be planned after construction is completed. After completion test with confirmation sufficient performance, all of the facilities will be taken over from the contractor.

(1) Detailed Design

Detailed Design will be performed out based on this Basic Design. Field survey and investigation will be planned for the design. Although various fields are included in the design, activities for design, should be maintained in close coordination so as to avoid any differences between each design field.

(2) Factory Manufacture

Radar equipment will be manufactured after the tender period. Quality evaluation should be considered at least three times, the manufacturer's design evaluation, mock-up test and factory tests including continuous operation tests. After complete testing, all of the modules, units are packed for transport. Cables are detached from the terminals.

(3) Field Working Plan

Before construction of facilities such as building, procurement of material should be planned. Local conditions should be considered in the implementation program because of seasonal condition which will probably affect construction activities particularly out-door work.

The building construction with complete utility functions should be completed before equipment installation.

(4) Installation and Testing

Equipment installation will be carried out by a technical team based on the installation manual. Testing will be made from unit to component, individual to integrate, and finally system performance test will be carried out.

Flight test will be conducted based on the Flight Inspection Manual established by FAA.

4.4.4 Construction Supervisory Plan

Characteristics of the works which is mainly composed of electronic and communication equipment, many fields of building construction are required in the construction works. The works of each field shall be controlled under the overall schedule.

Considering the subdivided specialty of the electronic engineers, it is most important to establish an organization which coordinates these specialties and integrates them with the architectural and facility planning.

In the construction supervision plan, therefore, an organization shall be established which has the function to coordinate and integrate each work on top of the organizations, and overall construction shall be monitored and controlled by the above organization.

4.4.5 Procurement Plan

The radar equipment for this project may be procured from any manufacturer of any country if complying with the requirement of the technical specification and local conditions of Nepal.

However, if the training for the radar controllers and maintenance staff is planned in Japan, the radar equipment which is manufactured in Japan, can be adaptable because the same type of equipment is desirable for the equipment which is used for the actual organization. Furthermore, the equipment for training can also to be procured from Japan for the same reason.

Although all equipment, except the above-mentioned, radar can be procured from a third country, it is necessary to confirm some points such as interface condition and difficulty of maintenance in terms of spare parts procurement.

4.4.6 Implementation Schedule

Figure 4.4.1 shows the implementation schedule of the works by the Japanese Grant Aid.

4.4.7 Scope of Work

Table 4.4.1 shows the demarcation between the Japanese Grant Aid and the works undertaken by Nepal side. Cost of works undertaken by Nepal are estimated as follows:

(1) Inside Airport

• Relocation underground cable	300 (Thousand NRs)
• Improvement airport boundary fence	600
• Preparation of maintenance vehicle	1,500

(2) Out side Airport

• Improvement access road	400
• Installation high tension voltage electric cable	500

(3) Commissioning Test

• Flight inspection	1,700
Total	5,000

All related electrical power line and internal telephone line works inside the DCA properties will be undertaken by Japanese Grant Aid to facilitate the execution of the Project work.

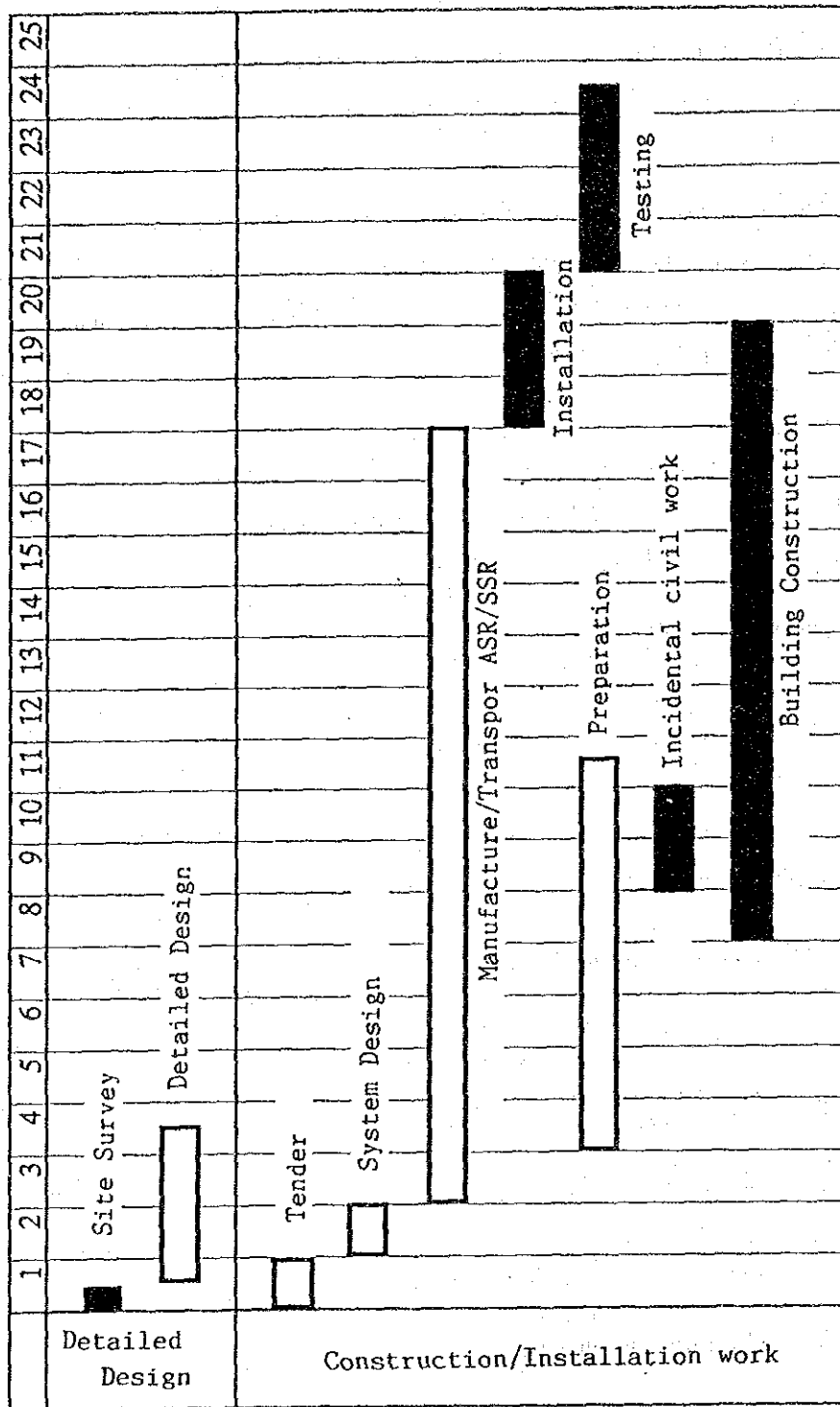


Figure 4.4.1 Implementation Schedule

Table 4.4.1 Scope of Construction Work

Work Item	Inside of Airport		Outside of Airport	
	HMG/DCA	JICA	HMG/DCA	JICA
1 Land Acquisition	Procurement all necessary land space		Procurement all necessary land space	
2 Law Application	Application for relevant law including frequency allocation		Application for relevant law including frequency allocation	
3 Equipment	Commissioning test including Flight test	Installation, Adjustment and Installation test Preparatory work for commissioning test	Commissioning test including Flight test	Installation, Adjustment and Installation test
4 Construction work				
- Road Access	Repair or improvement of existing road fence for temporary access road for construction	Construction of access road from building to the existing if necessary	Construction of access road from premises to the existing including reinforcement and expansion road width of the existing if necessary	Construction of access road within premises
- Electricity	Preparation power distribution and supply to the new building or facilities at Central Power Station	Installation electric power cable from Central Power Station to the building	Preparation of cable and transformer up to the primary terminal of transformer	Installation of cable from secondary terminal of transformer to the building
- Water Supply	Preparation of distribution valve on main water pipe	Installation water pipe from main valve to the building	Installation water pipe from main supply water pipe to premises valve	Installation water pipe up to premises valve
- Sewage		Preparation sanitary sewer		Preparation sanitary sewer and septic tank
- Fencing		Installation of necessary fencing		Installation of necessary fencing

4.5 Human Resources Development Plan for the Urgent Project

4.5.1 General

In order to cope with the training demand created by the introduction of radar service at TIA, it is required to establish a suitable human resources development plan which, together with a plan of technical assistance by international experts, plays an important role in determining the quality and the reliability of the radar service.

This human resources development plan is prepared for the Urgent Project specified in this report.

4.5.2 Prerequisite

The following should be taken into consideration in the process of planning:

- The radar service at TIA will be limited to radar monitoring initially. However, the controller should complete a typical international standard training course in order to meet the requirements specified in Annex-1 and to prepare for the introduction of the radar control scheduled in the near future.
- The maintenance personnel should also receive a full scale maintenance training in order to acquire the required skill and knowledge although module replacement maintenance will be introduced.
- Familiarization training will be commenced immediately after hand over of the radar equipment of Nepal. The radar operational equipment and the radar training equipment (simulator) will be handed over to Nepal simultaneously.
- Facility hand over field training for maintenance personnel will be planned at TIA.
- Radar trainees will be selected from the experienced personnel at TIA.
- Working schedule will be (when manpower has become sufficient) three crews/three shifts.

4.5.3 Training Demand

By the commencement of radar monitoring at TIA, the following number of personnel will have completed the suitable training.

Operation	- operation	: 6 (2 per 1 shift)
	- supervisor	: 3 (1 per 1 shift)
	- TIA instructor	: 3
	- CATC instructor	: 2
	- DCA staff	: 2
	<hr/>	
	Total	: 16
Maintenance	- radar head	: 6 (2 per 1 shift)
	- processor	: 6 (2 per 1 shift)
	- TIA instructor	: 3
	- CATC instructor	: 2 (1 for radar head, 1 for processor)
	- DCA staff	: 3
	<hr/>	
	Total	: 20

4.5.4 Training and Technical Assistance

I : Preparation Phase (~ facility accomplishment)

In this phase, initial preparation of the introduction of radar service at TIA will be conducted.

(a) Operation

Training

- Airspace adjustment and radar procedures (KTM)

During this stage, the DCA will execute the airspace adjustment in accordance with radar procedures supported by the international expert.

- Approach Radar Control training (overseas)

The controllers should acquire sufficient knowledge and skill for approach radar control service as specified in Annex-1 before the commencement of radar service at TIA. An approach radar control course at a suitable training centre should be utilized.

Technical assistance by international experts

Assist the DCA in:

- Preparation of procedures, documents, training syllabi, airspace (MVA) and radar rating

- Design evaluation of the radar system
- Arrangement of the overseas training
- Arrangement of the flight calibration

(b) Maintenance

Training

- Instructor training (overseas)

Selected radar instructors will be trained at the first stage in this phase so that the instructors can prepare for the suitable training plan.

- Basic radar theory and digital training (KTM)

Introduction of the radar and review of the digital techniques

- Vendor training (overseas) for selected trainees.

Acquisition of sufficient radar maintenance knowledge such as preventive maintenance repair, adjustment and alignment, module replacement, system monitor and control modification, and data update.

- Radar maintenance training (KTM)

Acquisition of sufficient radar maintenance knowledge will be conducted by the personnel who received the vendor training.

Technical Assistance by international experts

Assist the DCA in:

- Introduction of the radar system
- Theoretical training and OJT on digital techniques
- Preparation of maintenance manuals and training syllabi
- Advice on the design of the radar system
- Arrangement of the overseas training
- Arrangement of the flight calibration

(c) Action to be taken by Nepal DCA

- Acceptance of the international experts
- Selection of the counterpart personnel and the trainee
- Preparation of procedures, documents, training syllabi, airspace (MVA) and radar rating
- Design evaluation of the radar system
- Arrangements required for the fellowship training
- Skill evaluation
- Arrangement of the flight calibration

II : Hand-over Phase (facility accomplishment ~ hand over)

During this phase, facility hand-over field training is conducted by the equipment manufacturer at TIA and at the new CATC.

(a) Operation

Same as I (a)

(b) Maintenance

In addition to I (b)

Training

- Facility hand-over training (KTM)

Acquisition of sufficient knowledge and OJT for the maintenance of the installed radar system.

Technical assistance

Assist the DCA in:

- Facility acceptance inspection
- Facility hand-over field training

(c) Action to be taken by Nepal DCA

In addition to I (c)

- Facility acceptance inspection
- Facility hand-over field training
- Supervision of the training progress
- Issuance of NOTAM

III : Familiarization Phase (hand-over ~ commencement of radar monitoring)

During this phase, familiarization training is conducted at TIA and the new CATC using the equipment provided under the project.

(a) Operation

Training

- Simulator training
Simulator training by the scenario suitable for the traffic situation at TIA using the simulators at TIA and the new CATC.
- Familiarization with the installed radar system
- Confirmation of the limitation of the installed radar system

Technical assistance by international experts

Assist the DCA in:

- Simulator training
- Skill evaluation
- Review of procedures, documents and airspace (MVA)
- Preparation for the commencement of radar monitoring
- Issuance of radar rating

(b) Maintenance

Training

- Familiarization training
- Implementation of radar maintenance training using the equipment at TIA and the new CATC
- Familiarization with the installed radar system

Technical assistance

Assist the DCA in:

- Practical and laboratory training
- Radar maintenance
- Simulator maintenance
- Skill evaluation
- Review of documents
- Spare parts and test equipment control

(c) Action to be taken by Nepal DCA

- Execution of the simulator training
- Skill evaluation
- Review of procedures, documents and airspace (MVA)
- Issuance of NOTAM on the radar monitoring service at TIA
- Issuance of radar rating
- Execution of the flight calibration

IV : Operation Phase of radar monitoring (radar monitoring ~)

During this phase, radar monitoring is conducted at TIA. Training for backup personnel and brush-up training for the radar rated controller are conducted in order to maintain and improve the skill and to prepare for the introduction of approach radar control.

(a) Operation

Training

- Approach radar control training for the backup personnel
- Brush-up training
- Management training

Technical assistance by international experts

Assist the DCA in:

- Advice on daily radar operation and training
- Training of the backup personnel
- Review and revision of procedures, documents and airspace (MVA)
- Brush-up training
- Skill evaluation
- Improvement of radar service
- Preparation for the introduction of approach radar control

(b) Maintenance

Training

- Radar maintenance training for the back-up personnel
- Brush-up training
- Improvement of management ability and of motivation

Technical assistance by international experts

Assist the DCA in:

- Advice on daily radar maintenance and training
- Training of the backup personnel
- Brush-up training
- Skill evaluation

- Improvement of the radar maintenance
- Establishment of reliability control
- Simulator maintenance
- (c) Action to be taken by Nepal DCA
 - Arrangement of the radar training
 - Skill evaluation
 - Review and improvement of the existing radar services
 - Study and preparation of approach radar control
 - Arrangement of the management training course at the new CATC

4.5.5 Detail Planning

Though human resources development under the Urgent Project will be planned in accordance with the progress of other elements of the project, detailed arrangements for its execution may sometimes be flexible.

The overseas training for example, depends on the availability of space and financial resources and it may not necessarily be able to be conducted under the optimum conditions.

Detailed planning of human resources development is beyond the scope of this study and should be finalized by the authorities concerned in cooperation with the international experts.

CHAPTER 5 PROJECT EVALUATION AND CONCLUSION

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Tribhuvan International Airport (TIA), which is located in the center of the Kathmandu Valley, is surrounded by high mountain range. Such a severe topographic condition is not favorable for airport, and many restrictions are imposed upon the operation of aircraft and radio navigation aids at TIA.

The purpose of this Project is to install an Airport Surveillance Radar at TIA in order to secure safe operation of the aircraft flying in the airspace around TIA by monitoring and controlling the aircraft in the approach, go-around, takeoff, and climbing stages which are relatively dangerous.

The radar coverage, which is in general the most important factor in the radar operation, is not sufficient for full-scale radar control at TIA. However, the original purpose of the radar operation of this Project is not a radar control of many aircraft but monitoring of the aircraft, so that it is considered that the purpose of the project can be fully accomplished even in the above situation.

Since the radar installed by this Project is the first one in Nepal, not a few problems must be resolved by themselves for smooth operation and maintenance of the facilities. Especially, training of the radar controller and maintenance staff is very important.

By the operation of the Airport Surveillance Radar, safety of aircraft operation will make great strides at TIA, and it is forecasted that the activities of the airport will become more busy. As a result, this will contribute to promotion of tourism industry, increase of employment opportunities, and increase of earning of foreign currency. It is considered that effect on enhancement of public welfare and enrichment of social structure in Nepal will not be small.

This project will enhance the safety of aircraft operation at Kathmandu Airport, and will promote the constant development of air transport network in Nepal. It will thereby contribute to the overall political and economic development and promotion of tourism.

From the technical viewpoint, it is possible to accumulate the technology for radar control and maintenance through the experience of operation and maintenance at TIA, and it will be easy to shift to full-scale radar control in accordance with increase of air traffic volume at TIA in future.

Apart from these indirect effect, the following is the direct effect on safe operation at the airport expected by the radar.

The Present Situation and Problems	The Methods Taken by This Project	The Effect of the Project and the Degree of Implement
<p>1. The air traffic control system at Tribhuvan International Airport is based on predetermined procedure control previously issued. This method specifies the aircraft position, direction, height, etc. and when they are difficult to confirm from the ground, and when the aircraft cannot identify its own position, grave accidents may occur.</p>	<p>The Kathmandu Terminal Control Area (25 NM radius) will be provided with a terminal radar which can monitor this area. The ancillary building to accommodate the radar equipment and a radar operations building will also be provided.</p>	<p>It will be possible to determine the aircraft position, direction, and altitude at night and in times of low visibility from the ground with the radar. The radar will permit the aircraft to be controlled and monitored from the ground at all times. Accidents due to mistaken identity of aircraft can be prevented.</p>
<p>2. There are high hills in the approach and departure route at Tribhuvan International Airport, and should the aircrafts take an incorrect approach, takeoff, or incorrect heading, it will encounter problems, but these decisions are left up to the pilot to make his own decision.</p>	<p>With the secondary radar, the height of individual aircrafts will be monitored automatically and shown on the radar display.</p>	<p>The aircraft altitude will be monitored by the radar controllers who will notice any irregular display, and can pass on instructions to alter his height or rate of ascent or descent.</p>
<p>3. If aircraft flies at a wrong altitude, corrections cannot be made, since flying altitude cannot be confirmed from the ground.</p>	<p>Functions of Minimum Safe Altitude Warning (MSAW) will be added to radar data processing equipment.</p>	<p>Warning is indicated on the radar display if aircraft has descended or is expected to descend below the minimum descent altitude.</p>
<p>4. Air space is overcrowded due to the increase of departing and arriving aircraft at the airport so that a near miss can be a serious matter.</p>	<p>The direction and altitude of each aircraft is forecasted in the processing of radar signal, and conflict alarm will be made, if necessary.</p>	<p>If the air traffic controller confirms the alarm, he will give the instruction to the aircraft to change altitude and/or heading, so that a near miss can be prevented.</p>
<p>5. Existing training facilities of CATC is superannuated and small, and the equipment is inadequate. Especially there are no facilities for training of the required staff for the radar operations mentioned above.</p>	<p>Practical training facilities for the radar operation shall be established.</p>	<p>Training for the radar controller and maintenance staff can be executed by themselves in their own country.</p>

ATTACHMENTS

Attachment A Minutes of Discussion on the
Basic Design Study on the
Project for Modernization of
Tribhuvan International Airport
in His Majesty's Government of Nepal

Attachment B Memorandum (1)

Attachment C Memorandum (2)

Attachment D Memorandum (3)

MINUTES OF DISCUSSION ON
THE BASIC DESIGN STUDY ON THE PROJECT
FOR MODERNIZATION OF TRIBHUVAN INTERNATIONAL AIRPORT
IN HIS MAJESTY'S GOVERNMENT OF NEPAL
(Consultation on Draft Report)

In accordance with the study of "Tribhuvan International Airport Modernization Plan", the JICA Study Team has prepared the basic design draft report of the most urgent components of this Project.

In order to explain and to consult the Nepalese side on the components of the draft report, JICA sent to Nepal a study team, which is headed by Mr. Toshiyuki Iwama, Second Basic Design Study Div., Grant Aid and Design Dept., JICA and is scheduled to stay in the country from November 3 to 12, 1993.

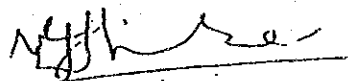
As a result of the discussions and field survey, both parties confirmed the items described on the Attachment.

Kathmandu, November 5, 1993

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Mr. Toshiyuki Iwama

Leader
Draft Report Explanation Team,
JICA



Mr. N. P. Ghimire

Leader
Counterpart Team
Department of Civil Aviation

Attachment

1. Components of the Draft Report

His Majesty's Government of Nepal has in principle agreed to the components of the Draft Report proposed by the team, provided their comments within three (3) weeks of time, be incorporated in the Final Report.

2. Japan's Grant Aid System

- 1) His Majesty's Government of Nepal has understood the system of the Japanese Grant Aid explained by the team.
- 2) His Majesty's Government of Nepal will take necessary measures, described in Annex for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further Schedule

The team will make the final report in accordance with the confirmed items, and submit it to His Majesty's Government of Nepal around February 1994.

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Annex

Necessary measures to be taken by His Majesty's Government of Nepal in case Japan's Grant Aid is executed.

1. To secure the site for the Project.
2. To clear, level and reclaim the site as well as to relocate the existing facilities prior to the commencement of the construction.
3. To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site.
4. To construct the access road to the site boundary prior to the commencement of the construction.
5. To provide the following facilities;
 - 1) Power distribution line to the site boundary
 - 2) Provision of water supply to the site
 - 3) Provision of drainage
 - 4) Telephone trunk line and the main distribution frame/panel of building
 - 5) Provision of gas, if any
 - 6) General furniture, carpet, curtain etc.
6. To implement commissioning test for operation.
7. To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement.
8. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.
9. To exempt Japanese Nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Nepal with respect to the supply of the products and services under the verified contracts.
10. To accord Japanese nationals whose services may be required in connection with the supply of products and the services under the verified contracts, such as facilities as may be necessary for their entry into Nepal and stay therein for the duration of their work.
11. To use and maintain properly and effectively all the facilities constructed and equipment purchased under the Grant.
12. To bear all the expenses other than those to be borne by the Grant.

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Memorandum (1)

1. The Draft Report Explanation Team (called The Team) explained the discussion result with Ministry of Finance.

- Outline of Japanese grant aid system
- Outline of the Draft Report
- Undertaking matters by His Majesty's Government on Urgent Project
- Necessity of new budget arrangement and human power resources development for the Project
- Draft Minutes of discussion

The Ministry of Finance understood the allocation of necessary budget for the works to be implemented by the Nepalese side as well as for the operation and maintenance.

2. The comments on the Draft Report, which was submitted on October 31, 1993, will be provided by the Nepalese side within three (3) weeks.

The final contents shall be incorporated with the discussed item on Interim Report (1) of the Study on Tribhuvan International Airport Modernization Plan.

3. The Team suggested to re-utilized the existing building at Thimi site for the Training Center of the Project.

The Nepalese side replied that this is not possible because they intend to maintain the existing function as the receiving site.

4. The Team confirmed on the undertaking works with the Nepalese side as follows:

- Relocation of farmers at the construction site of Training Center at Thimi will be arranged by the Nepalese side

The Nepalese side explained that they considered no difficulty on the relocation of farmers because of the current good relationship with them.

- The security at Thimi site will be considered by the Nepalese side
- Technical assistance for the commissioning test will be done by the Japanese side.

Financial arrangement for the test will be done by the Nepalese side.

MEMORANDUM (2)

The meeting on the works boundary of the utilities of Urgent Project between JICA Team and The Counterpart of Nepalese side was held on November 7, 1993 at TIAO and Thimi site.

The items discussed and confirmed are shown as follows;

1. RADAR SITE

1) Power Supply System

- The power supply shall be fed from the existing Main Substation by 3 phase 11 KV in consideration of system reliability and governability of system comparing with the feeding from the existing NEA station, which is located near the crush stone site at the south side of main runway.
- The Project shall cover all relevant works in the airport premise.
- The conceptual drawings of power supply system are shown in Attachment s- 1.

2) Water Supply System

- The water supply for the Radar Site shall be branched from the existing water distribution line running along the perimeter road at the south side of runway 20.
- The Project shall cover all works after the branching works.

3) Sewage Disposal

- Septic tank system (Soak pit) shall be applied for the building as the sewage disposal system at the Site.
- The standard drawing of septic tank provided by TIAO shall be refereed for the design of the system in consideration of capacity.

4) Others

- Telephone system for the site shall be branched from the existing exchanger at the existing Operation Building.
- TIAO is now plan to construct and improve the airside boundary wall around the runway 20.

The demolition of the wall at the relevant portion with the Project was agreed with TIAO for the implementation of the Project.

The system diagramm of telephone and water supply system is shown in Attachment- 1.

2. OPERATION BUILDING

1) Location

- The Team shall re-study the proposed location of building in consideration of underground facilities based on the as-built drawing provided by TIAO.

2) Power Supply System

- The power supply system for the building shall be done by the low tension distribution line feeding from the adjacent Main Substation.
- The Team requested the Counterpart to check the possibility of power supply for the essential load of about 50 KVA from the existing 350 KW generator.
- The Counterpart replied that they will study the spare capacity for the connection of the essential load of the Project to the generator.

3) Water Supply System

- The water supply system for the building shall be branched from the existing distribution pipe line that is located along the perimeter road at the airside of Main Substation.

4) Sewage Disposal

- The sewage system of the building shall be connected with the existing main pipe, which is located along the access road at the west side of the terminal area.

5) Telephone System

- The telephone system shall be branched from the existing exchanger at the existing Operation Building.

The system diagrammes abovementioned are shown in Attachments-2.

3. TRAINING CENTER AT THIMI

1) Power Supply System

- The power supply to the building shall be branched by the overhead wire from the 11 KV power line, which is existed along the public road.
- The incoming works from the existing 11KV power line to the site shall be done by the Nepalese side.
- The construction boundary between Nepalese side and the Project shall be settled at the primary point of Load Disconnecting Switch (LDS) on the incoming pole, which is installed by the Project.
- Metering meter installed on the incoming pole shall be prepared by the Nepalese side / NEA.

2) Sewage System

- Septic tank system shall be applied.

The design condition shall be same as the Radar Site Building.

3) Water Supply System

- The Nepalese side shall take the responsible for the supplying of water to a reservoir tank, which is provided by the Project.

The Project shall prepared a water supply facility for building consisting of reservoir tank, pumping facility, elevated tank and relevant piping works and facility.

4) Telephone System

- The telephone line shall be branched from the public telephone line located along the existing public road.
- The Nepal side shall taken the responsible for the connection at the terminal box in New Training Center building.
- The Project shall taken the responsible from the provision of terminal box and the following works.

5) Access Road

- The improvement of the existing access road to the site shall be done by the Nepalese side

The system diagrammes abovementioned are shown in Attachments-3.

4. OTHERS

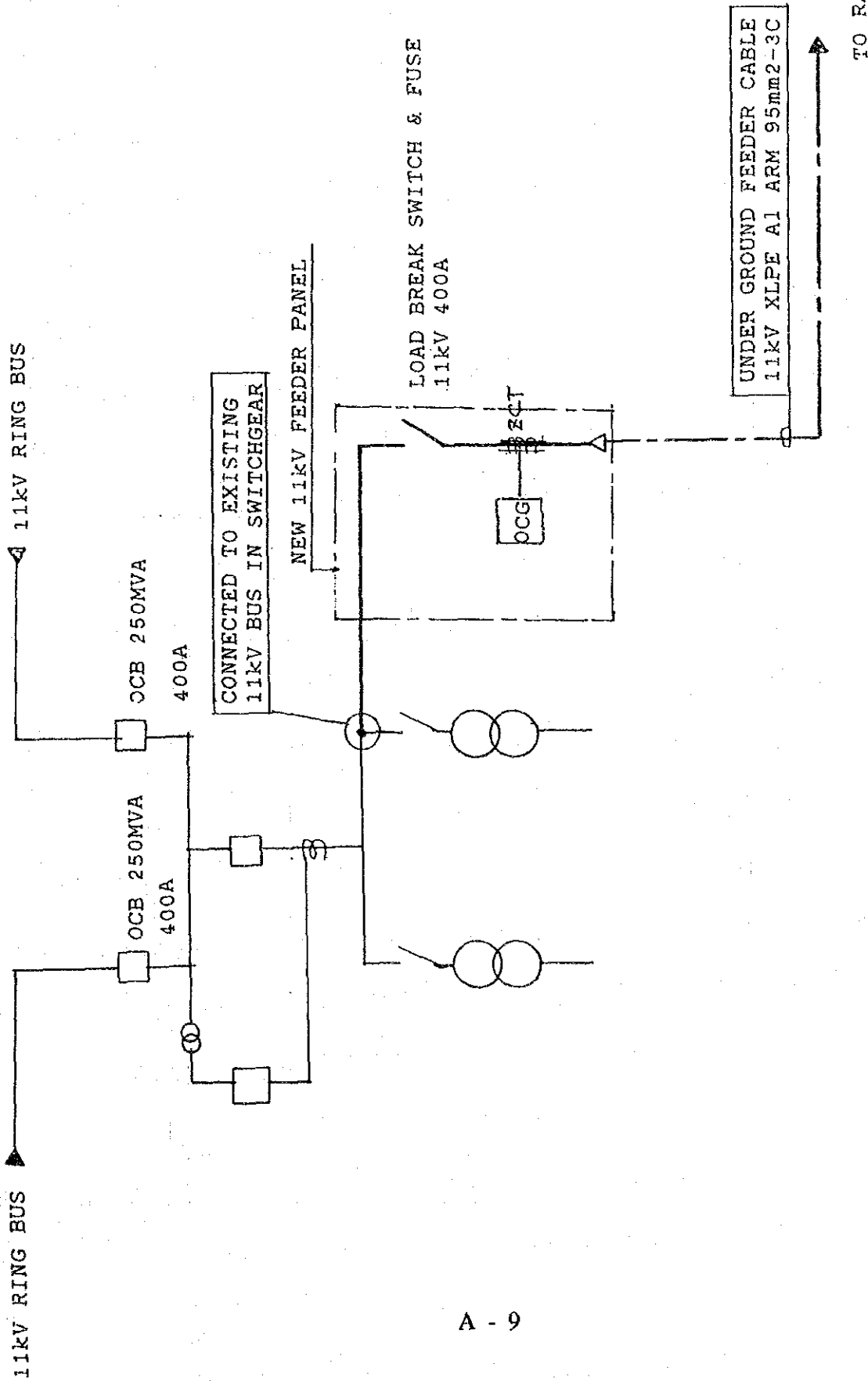
- The Team requested the recommendable local contractor's list for the Project for the Counterpart.

The Counterpart replied that they will make available the list of A class contractor within a few days.

- The Counterpart will prepare an available material list in the market at Katmandu based on the B/Q items submitted by the Team.
- The Counterpart replied to the Team that there are no specified standard or regulation for fire safety , architecture, etc.,

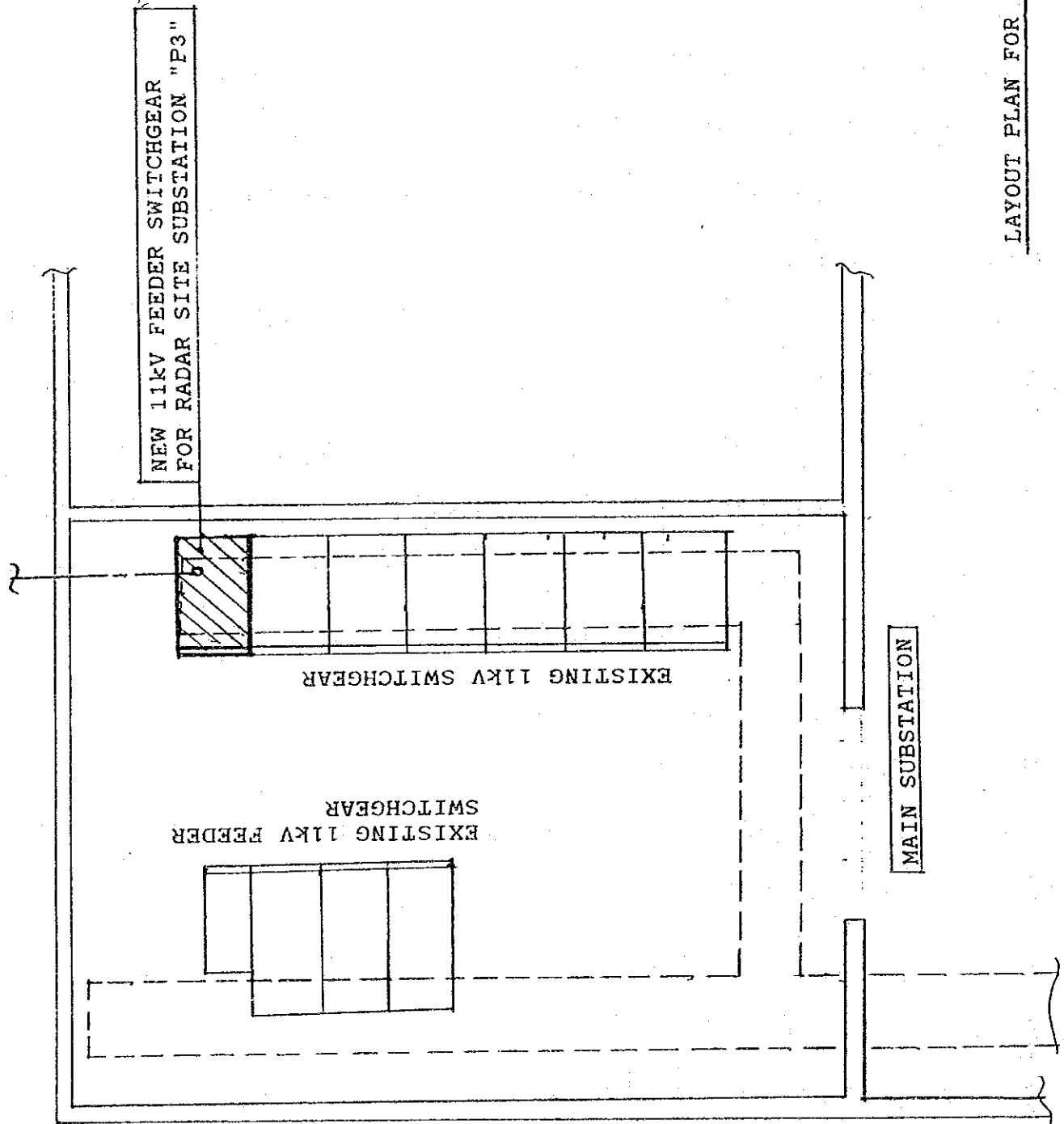
The conventional engineering standards used in Nepal is the Indian Standards or British Standards.

The applied standard on an engineering works by the foreign consultant is followed the consultant's recommendation.

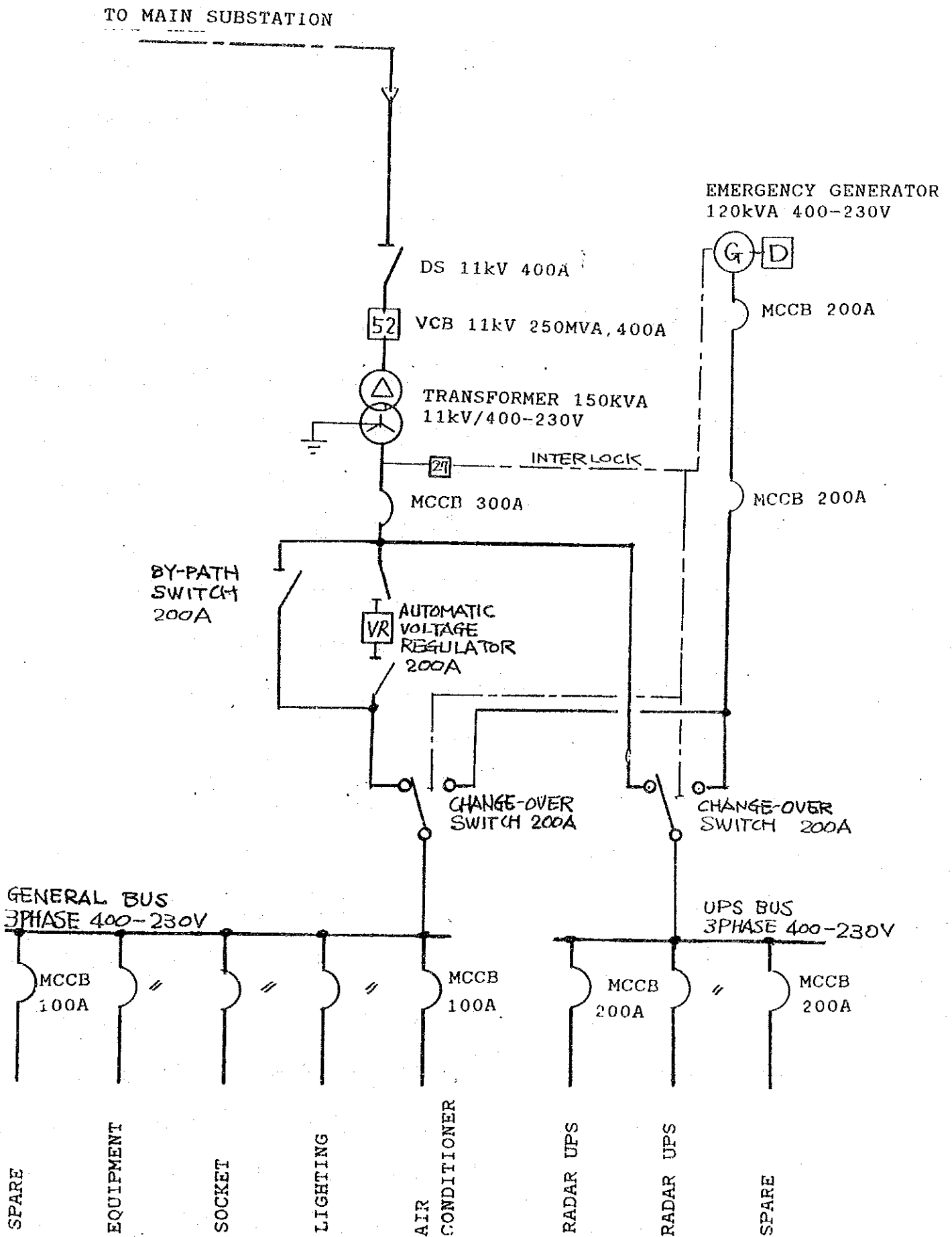


SINGLE LINE DIAGRAM FOR NEW
FEEDER CONNECTION WORK

TO RADAR SITE "P3"
11KV XLPE AI ARM 95mm2-3C

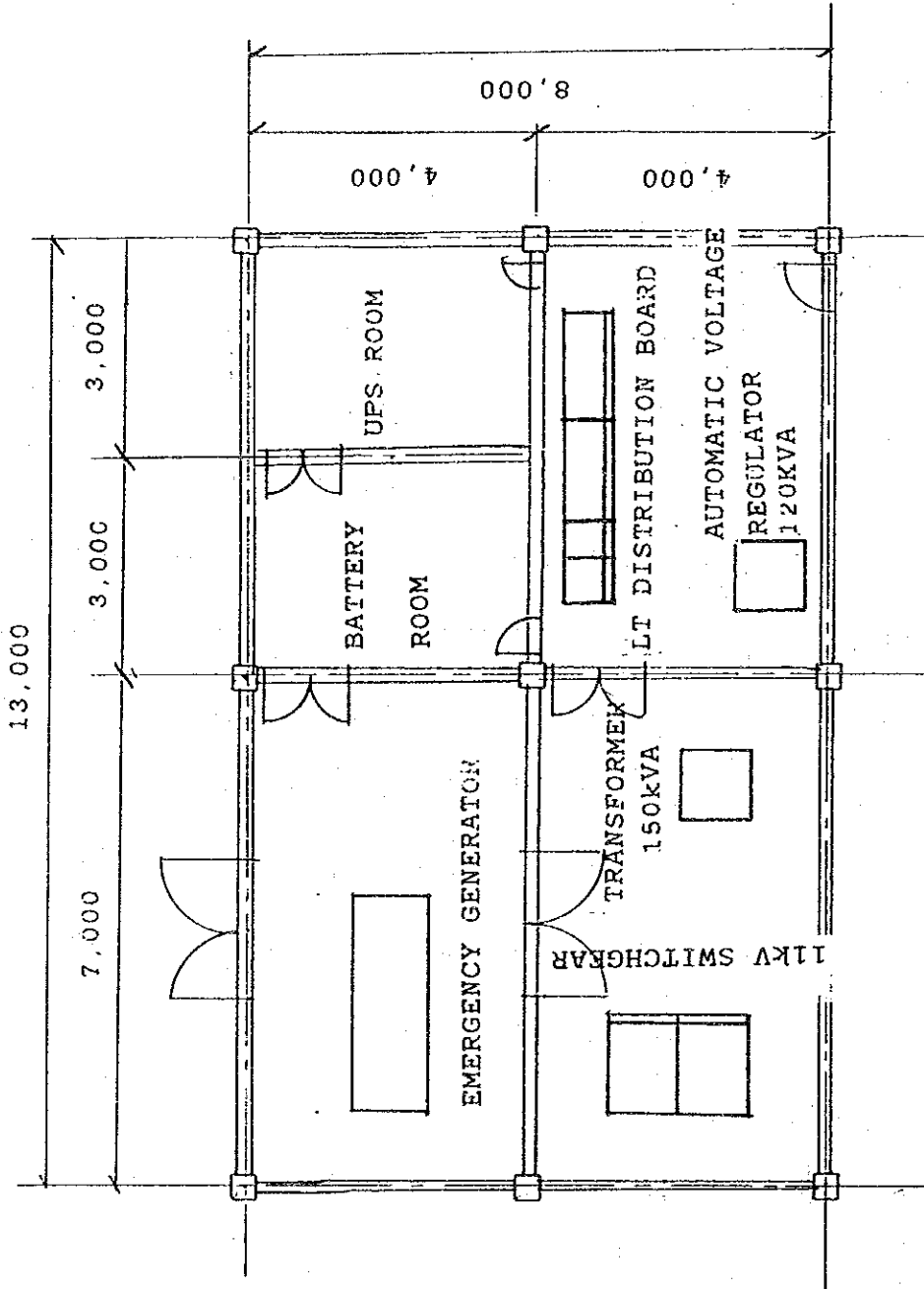


LAYOUT PLAN FOR 11KV FEEDER SWITCHGEAR



A - 11

SINGLE LINE DIAGRAM FOR RADAR SITE SUBSTATION "P3"





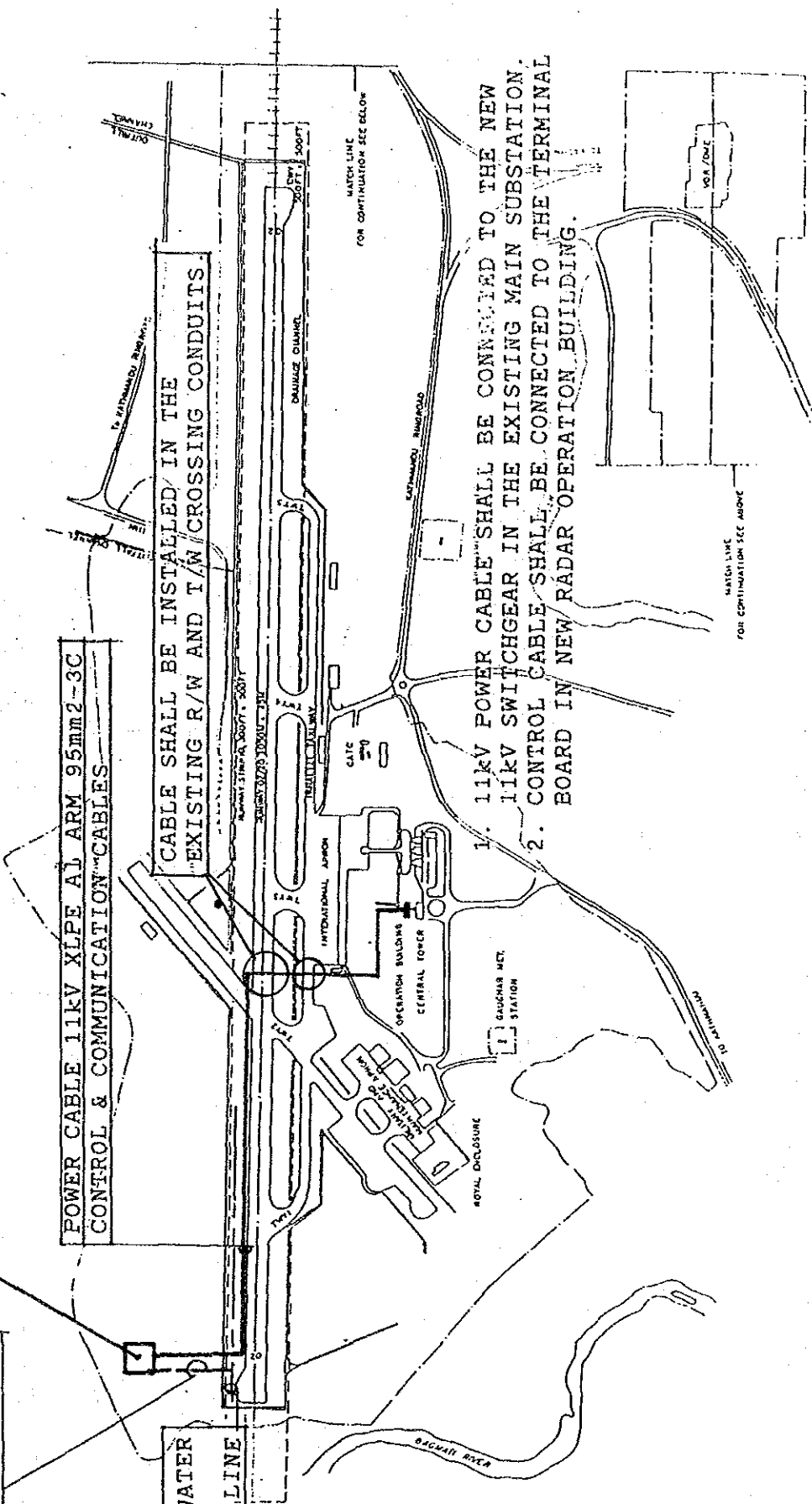
Radar Facilities

WATER SUPPLY PIPE 40mm

EXISTING WATER MAIN PIPE LINE

POWER CABLE 11kV XLE AL ARM 95mm²-3C
CONTROL & COMMUNICATION CABLES

CABLE SHALL BE INSTALLED IN THE EXISTING R/W AND I/W CROSSING CONDUITS.

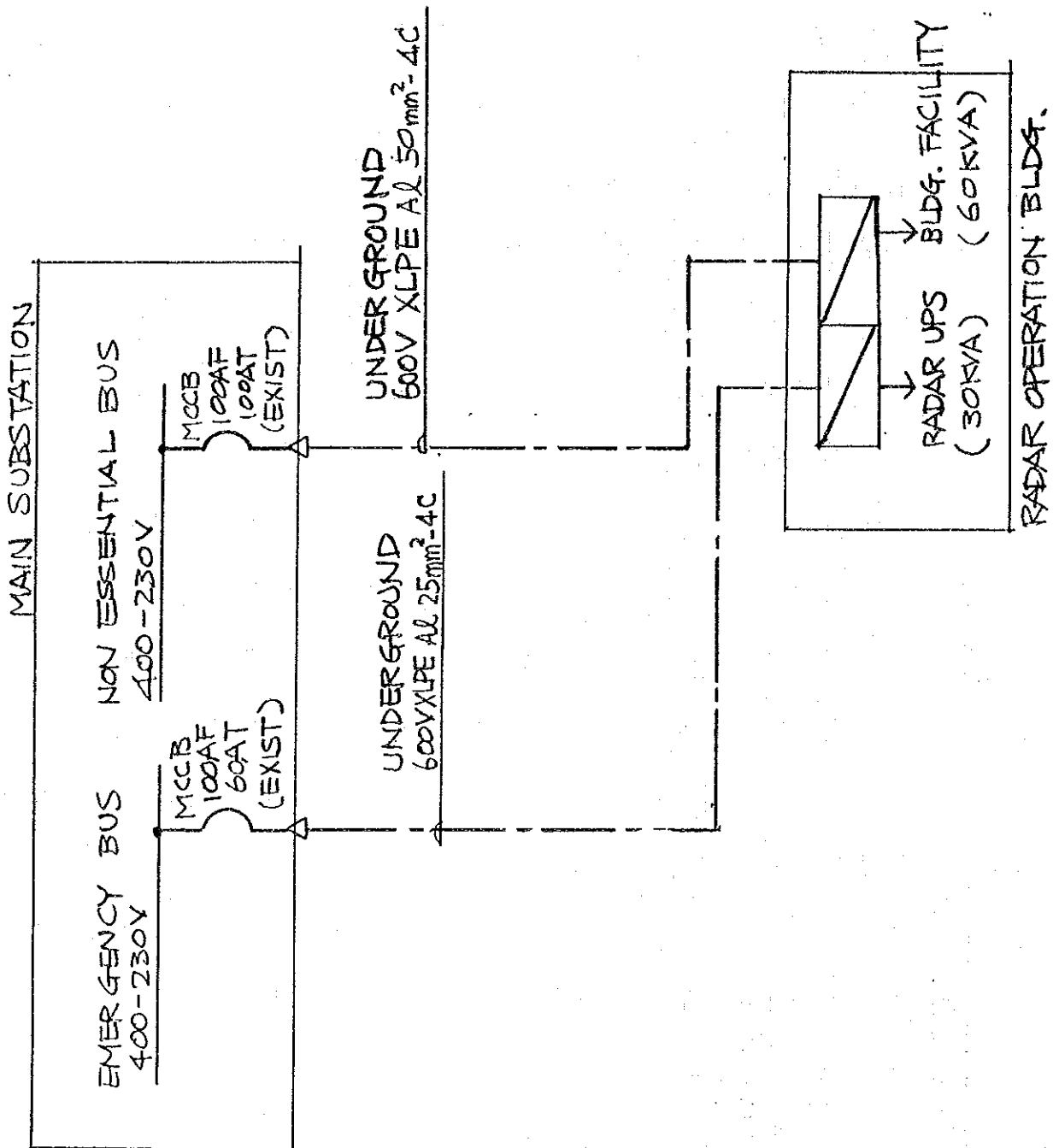


1. 11kV POWER CABLE SHALL BE CONNECTED TO THE NEW 11kV SWITCHGEAR IN THE EXISTING MAIN SUBSTATION.
2. CONTROL CABLE SHALL BE CONNECTED TO THE TERMINAL BOARD IN NEW RADAR OPERATION BUILDING.

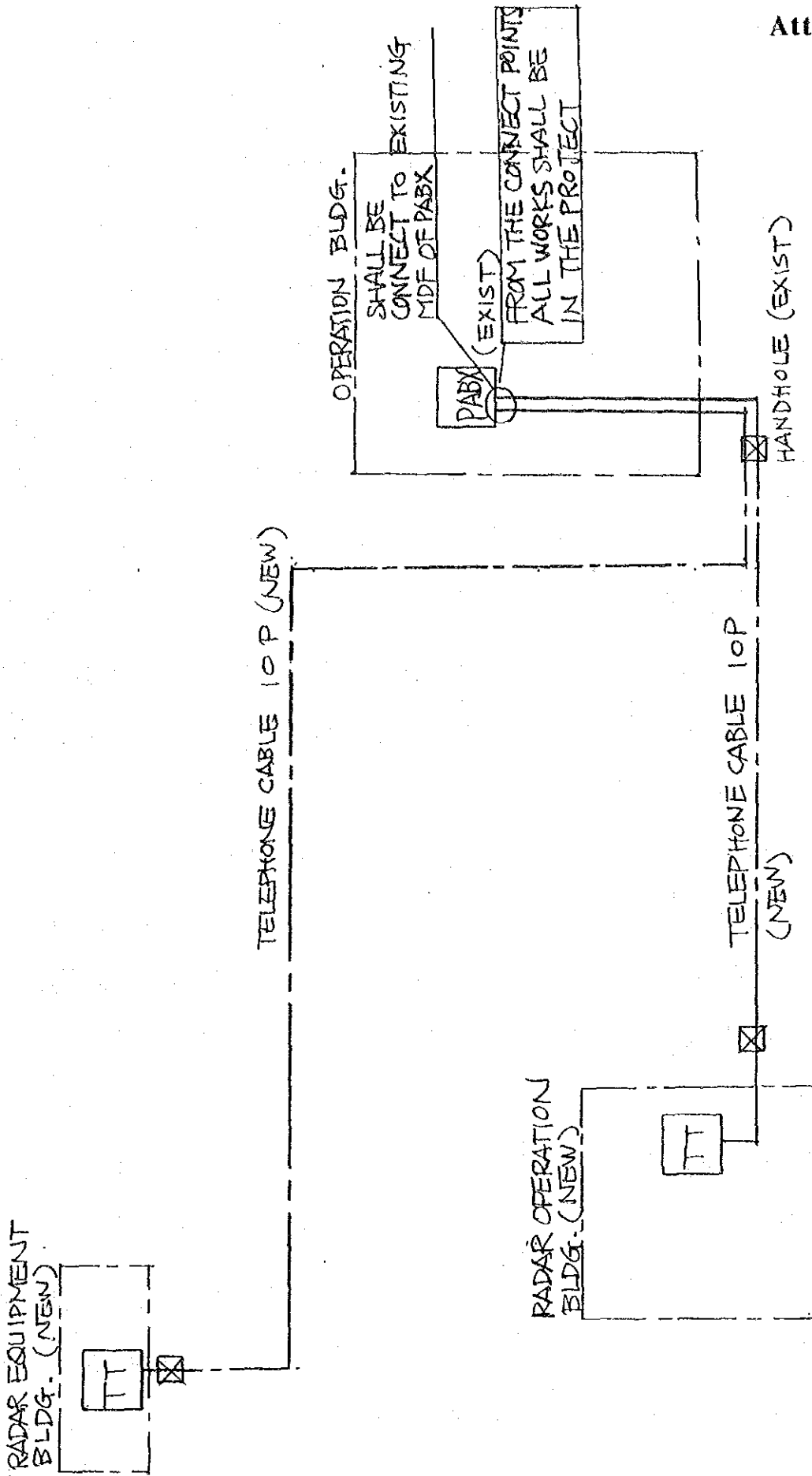
MATCH LINE FOR CONTINUATION SEE BELOW

MATCH LINE FOR CONTINUATION SEE ABOVE

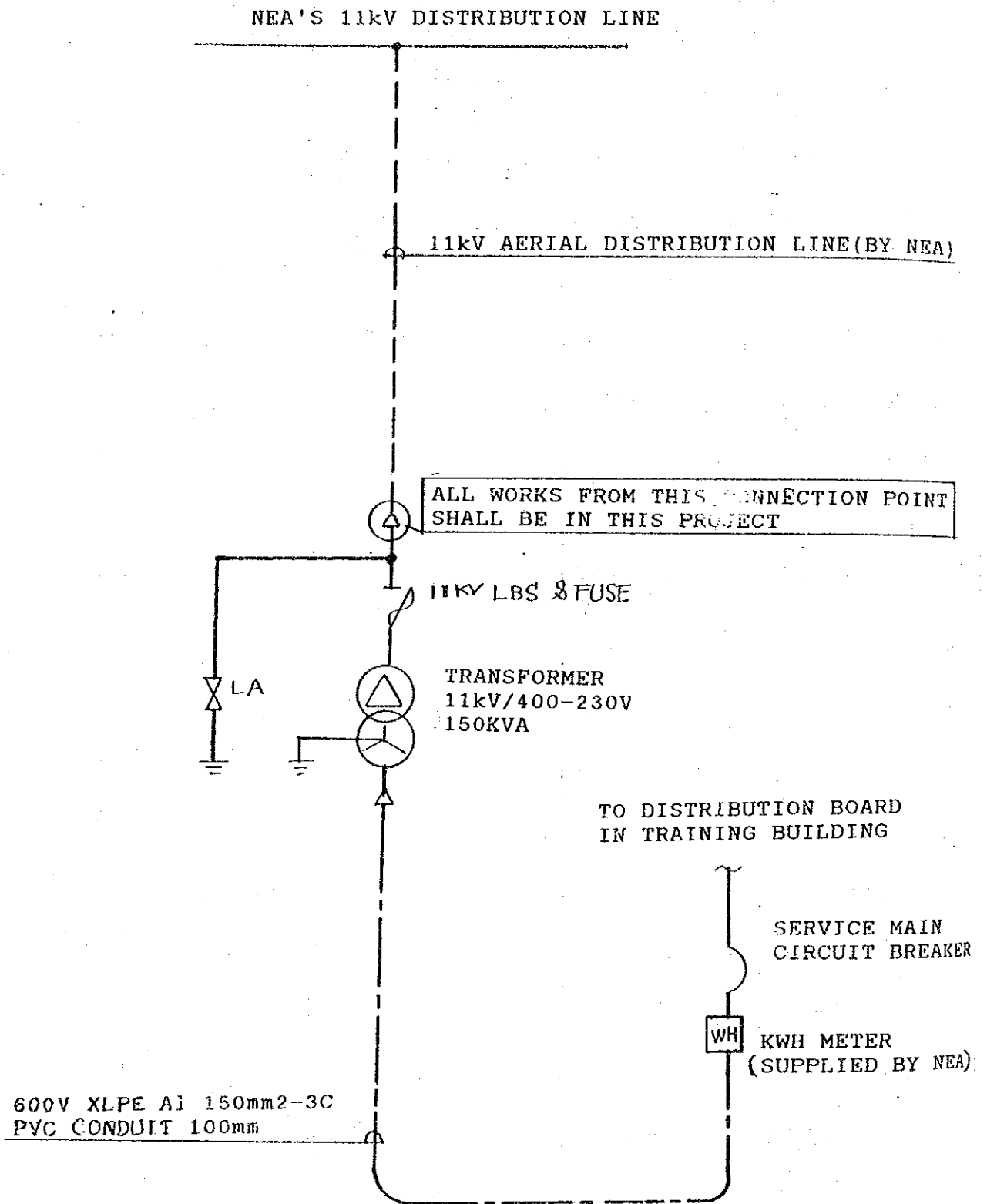
UTILITY LAYOUT PLAN FOR RADAR SITE



RADAR OPERATION BLDG.
POWER SUPPLY PLAN

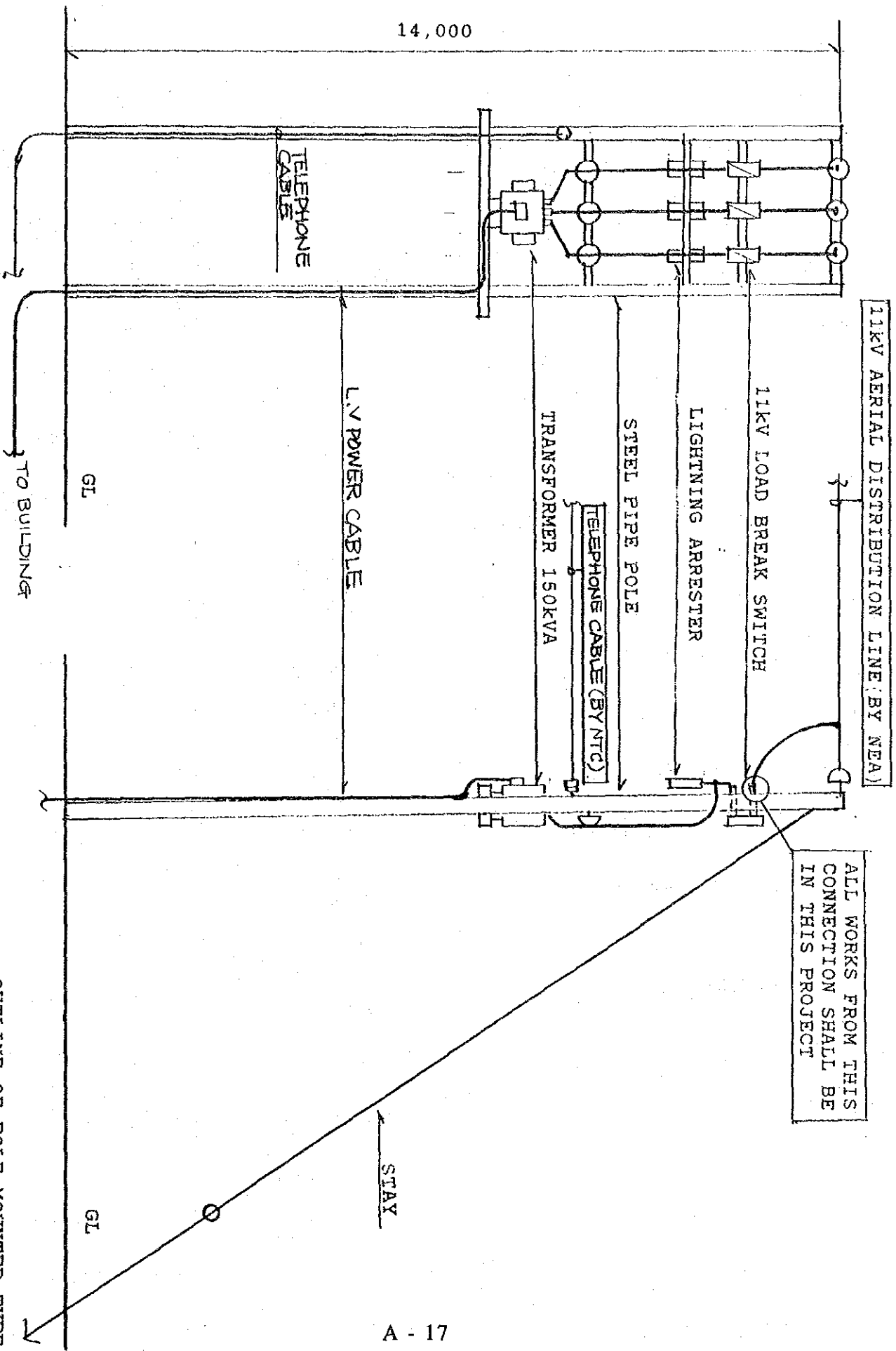


TELEPHONE CABLE CONNECTION DIAGRAM



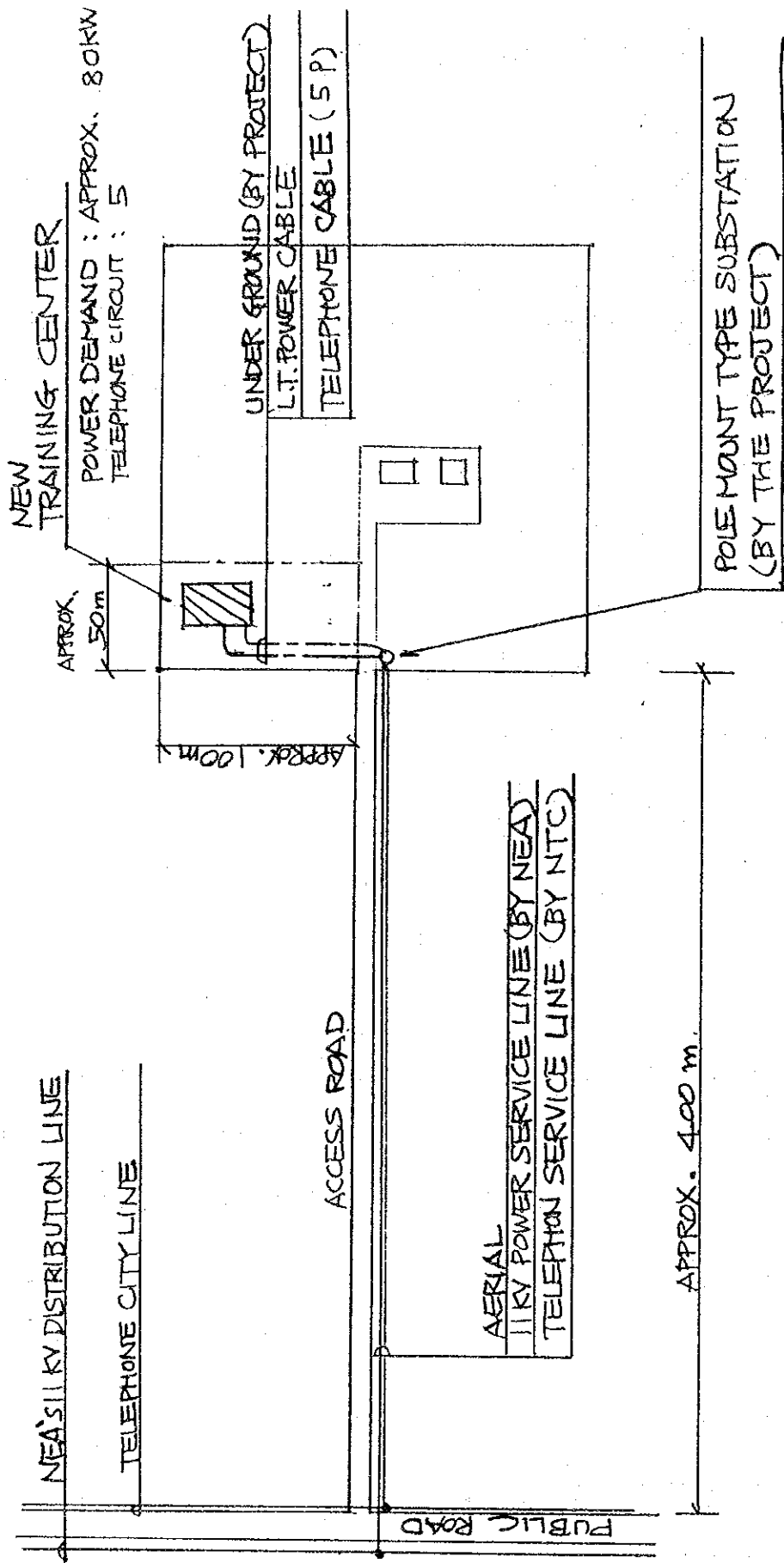
SINGLE LINE DIAGRAM
FOR THIMI TRAINING FACILITY

14,000

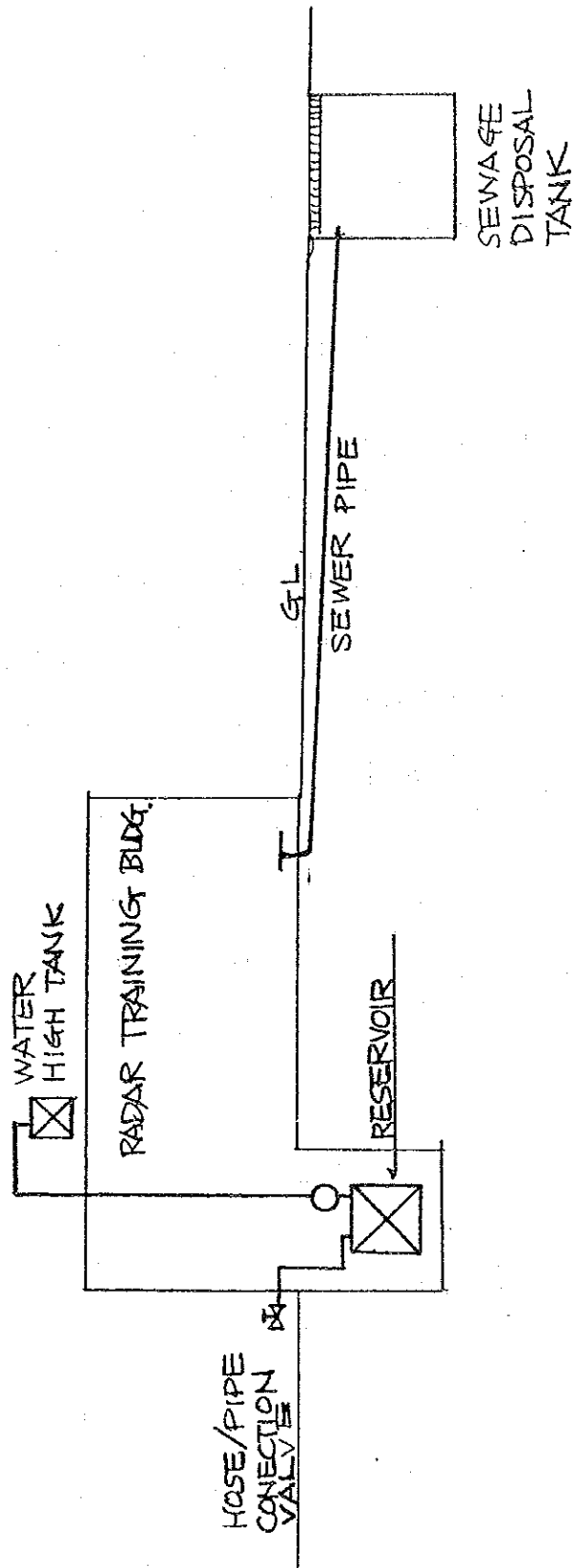


ALL WORKS FROM THIS CONNECTION SHALL BE IN THIS PROJECT

OUTLINE OF POLE MOUNTED TYPE SUBSTATION FOR THIMI TRAINING FACILITY



THIMI TRAINING FACILITY
ELECTRIC POWER AND TELEPHONE
SERVICE PLAN



THIMI TRAINING FACILITY
WATER AND SEWAGE
SYSTEM PLAN

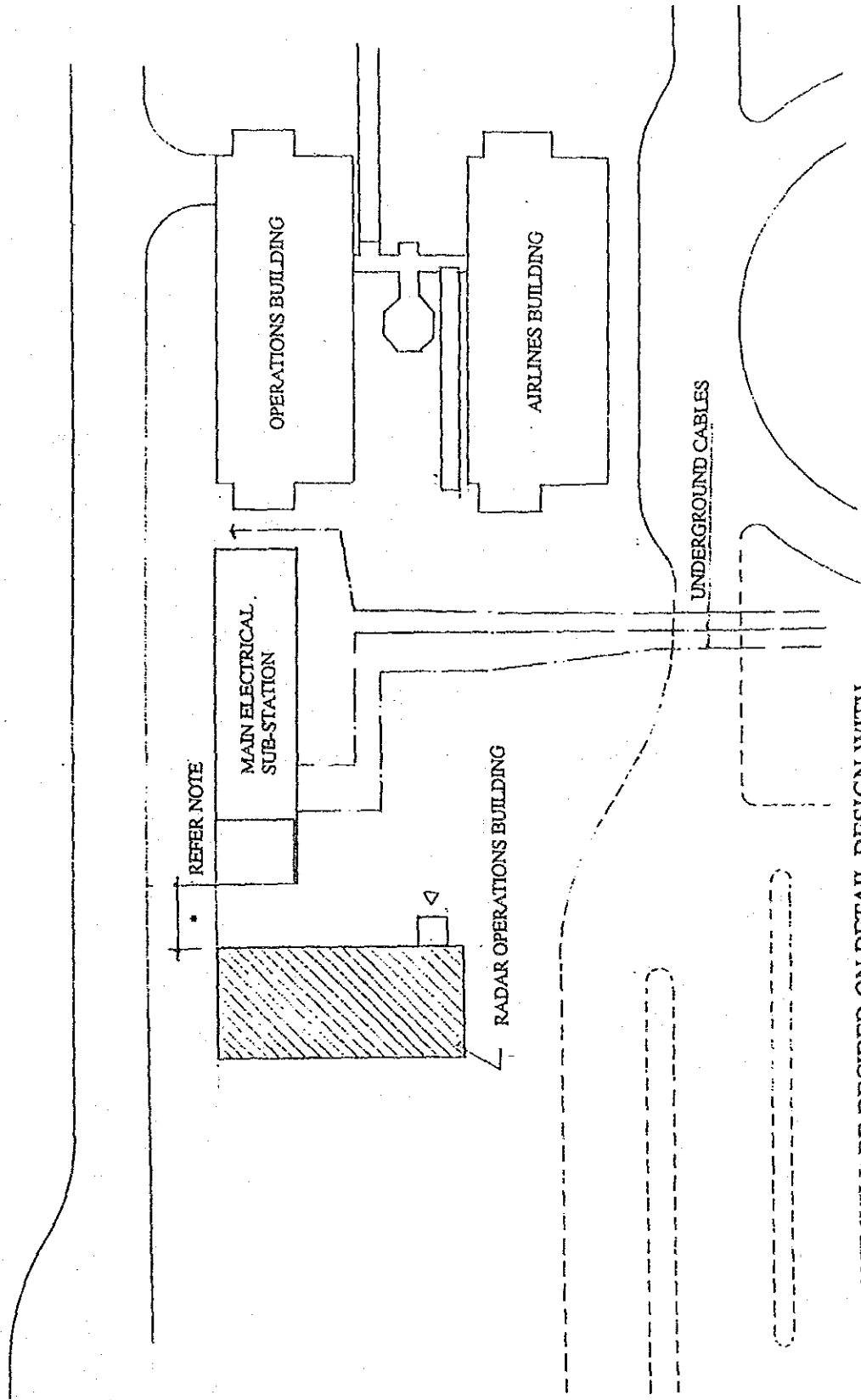
MEMORANDUM (3)

The meeting was held on November 12 and 16, 1993 at DCA office with the object of discussing Radar Training Building design criteria between the Counterpart Team and JICA Study Team.

- 1) The Study Team has explained the draft of layout plan of Radar Training Building which is revised from Basic Design Draft Report.
- 2) Accommodation : 12 persons Radar Controller Trainee
12 persons Radar Maintenance Trainee
can be trained at the time.
- 3) The Counterpart Team agreed basically, and pointed out necessity of the following function additionally on the draft of layout plan.
 - One Officer Room for Chief of Training Center
 - One Conference Room
 - One Guard Room
 - One Administration Room
- 4) The Study Team finalized the draft of layout plan which is considered the Counterpart Team requirements and submitted to the Counterpart Team.

The final layout plan is referred in Attachment.

APRON



NOTE : DISTANCE WILL BE DECIDED ON DETAIL DESIGN WITH CONSIDERATION OF DCA REQUIREMENT

Radar Operations Building Site Layout Plan

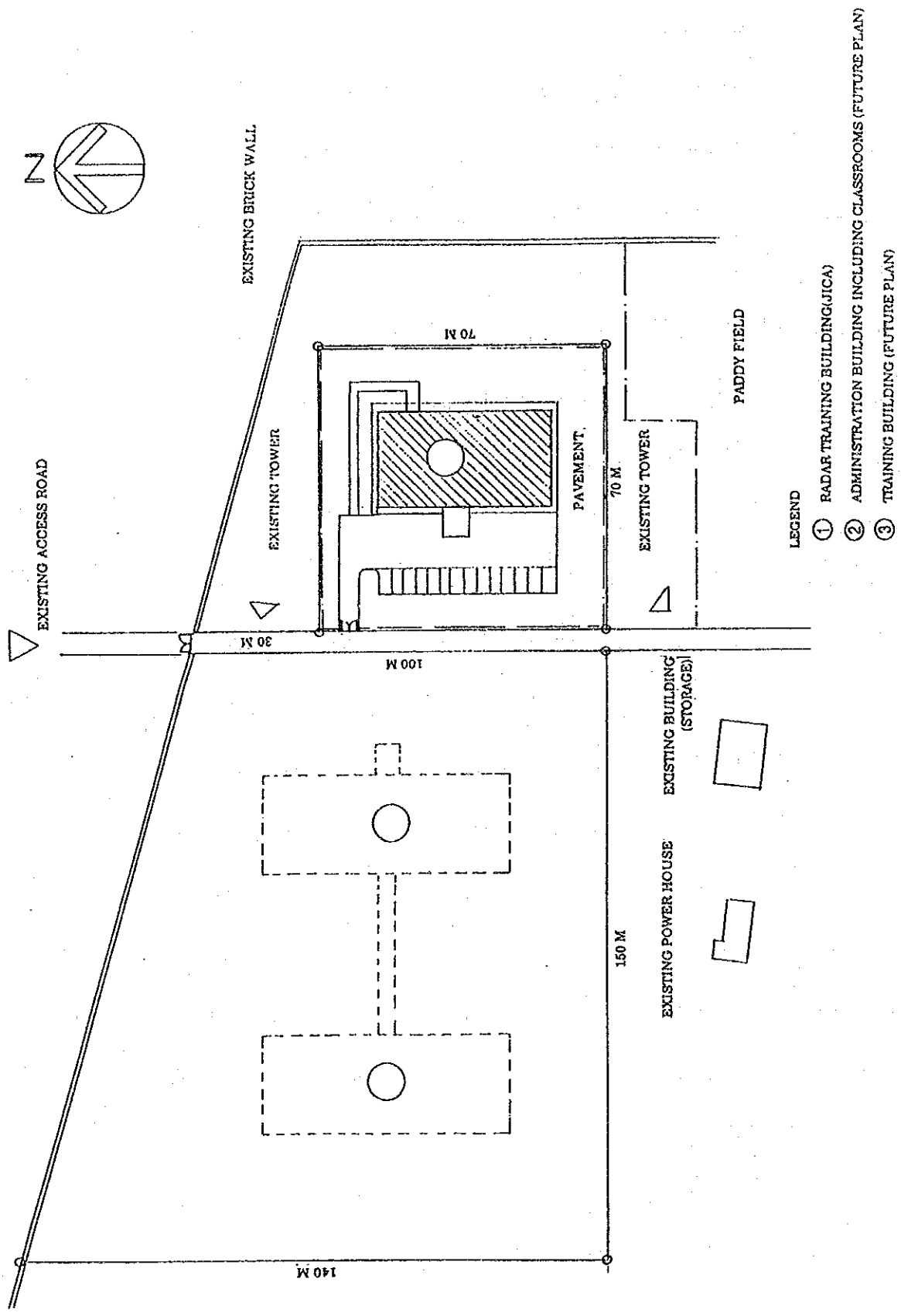
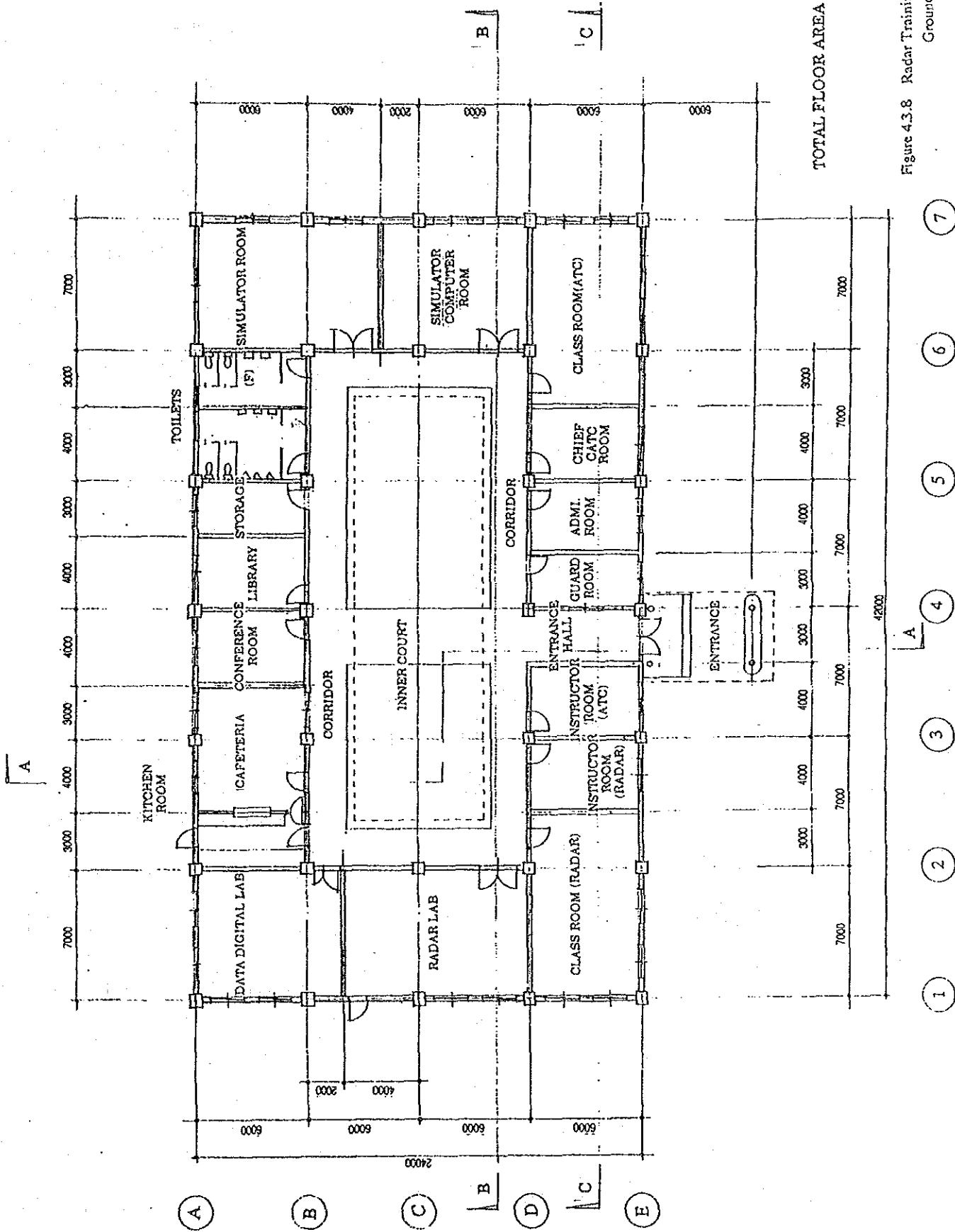


Figure 4.2.10 Radar Training Building Site Layout Plan



TOTAL FLOOR AREA : 696 M²

Figure 4.3.8 Radar Training Building Ground Floor Plan

JICA