

CHAPTER 4 BASIC DESIGN

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4.1 Design Policies

The centralization of various educational functions to the NIE, an integrated research and training institute of the MOE, is currently in progress. The Project intends the construction of core facilities capable of performing advanced functions and the following design policies have been adopted to enable this educational research and training building complex symbolize its status and perform its expected role by the effective combination of its various functions.

(1) Functional and Easy-to-Use Facilities

Special arrangements will be required for the vertical structure of the NIE (i.e. divisions and sections) to be well integrated with the horizontal elements (i.e. officers, researchers, administrative staff and trainees, etc.) for good communication between the divisions and sections to guarantee the promotion of the NIE's research and training function. In addition, the Library and Information Building, Training Building and Workshop Buildings should be located together as common facilities to achieve their efficient use. The eradication of duplicated facilities and emphasis on the introduction of highly advanced facilities will further improve the effects of the assistance.

(2) Well Integrated Facilities with Advanced Functions

The introduction of composite space will be required to terminate the conventional sectionalism where each facility has no meaningful relationship with other facilities and to make all the facilities function in an integral manner. Advanced techniques for a complex building, such as the provision of space stimulating visual communication and the sharing of boundary areas by various sections, should be employed to create modern building space while stressing on adaption to the local climate and environment.

(3) Comfortable Environment Adapted to Local Climate

In view of Sri Lanka's tropical, as well as oceanic, climate, the local architectural style must be taken into consideration to avoid strong sunshine, heavy rain and strong winds. The building plan should actively adopt eaves, louvres and galleries. A comfortable building environment must be achieved with little reliance on mechanical equipment and using natural lighting and ventilation as much as possible. Such carefully decided measures as the avoidance of central corridors and the locationing of each room to face a wide

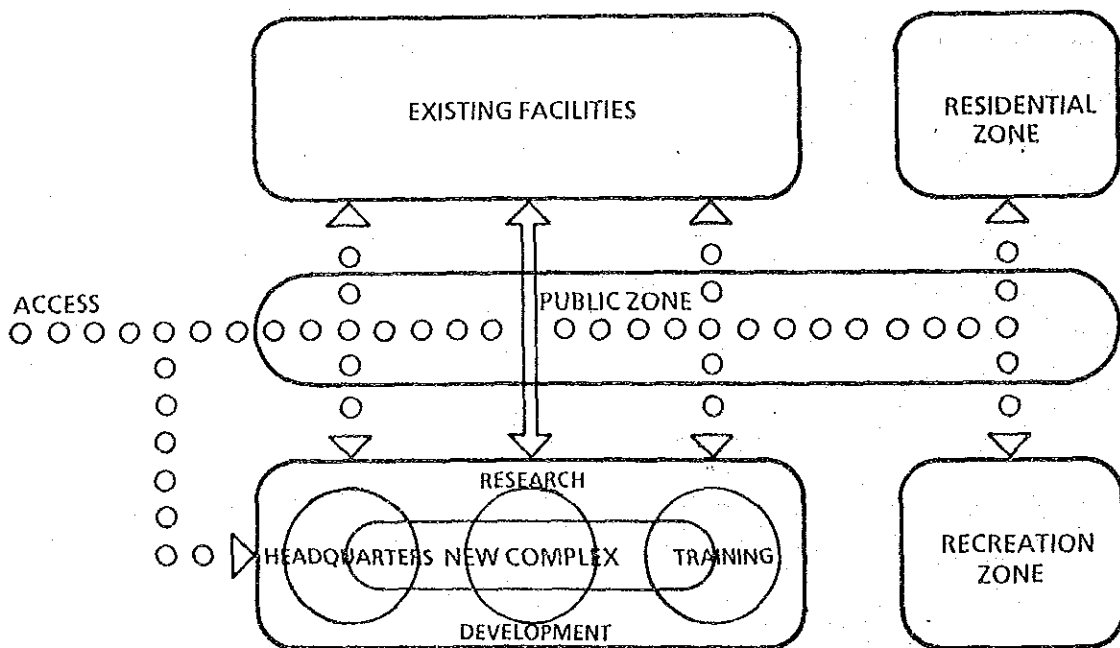
open space will be essential to secure such an environment. The provision of air-conditioning has been rejected except where absolutely necessary in view of the room functions as this requirement imposes a difficult condition on modern facilities as those planned in the Project, especially in the rainy season, and necessitates a highly elaborate building plan.

(4) Economical and Easy-to-Maintain Facilities

Planning emphasis should be given to energy saving, simple building service systems and equipment durability to achieve economical facilities. Durability in view of easy maintenance and availability in Sri Lanka should be stressed in construction material selection. In addition, the adoption of local construction methods should be considered.

(5) Symbolic Facilities

The facilities to be constructed with assistance should not only contribute to the NIE's research and training activities but should also functionally and visually symbolize the NIE as a modern educational institution.



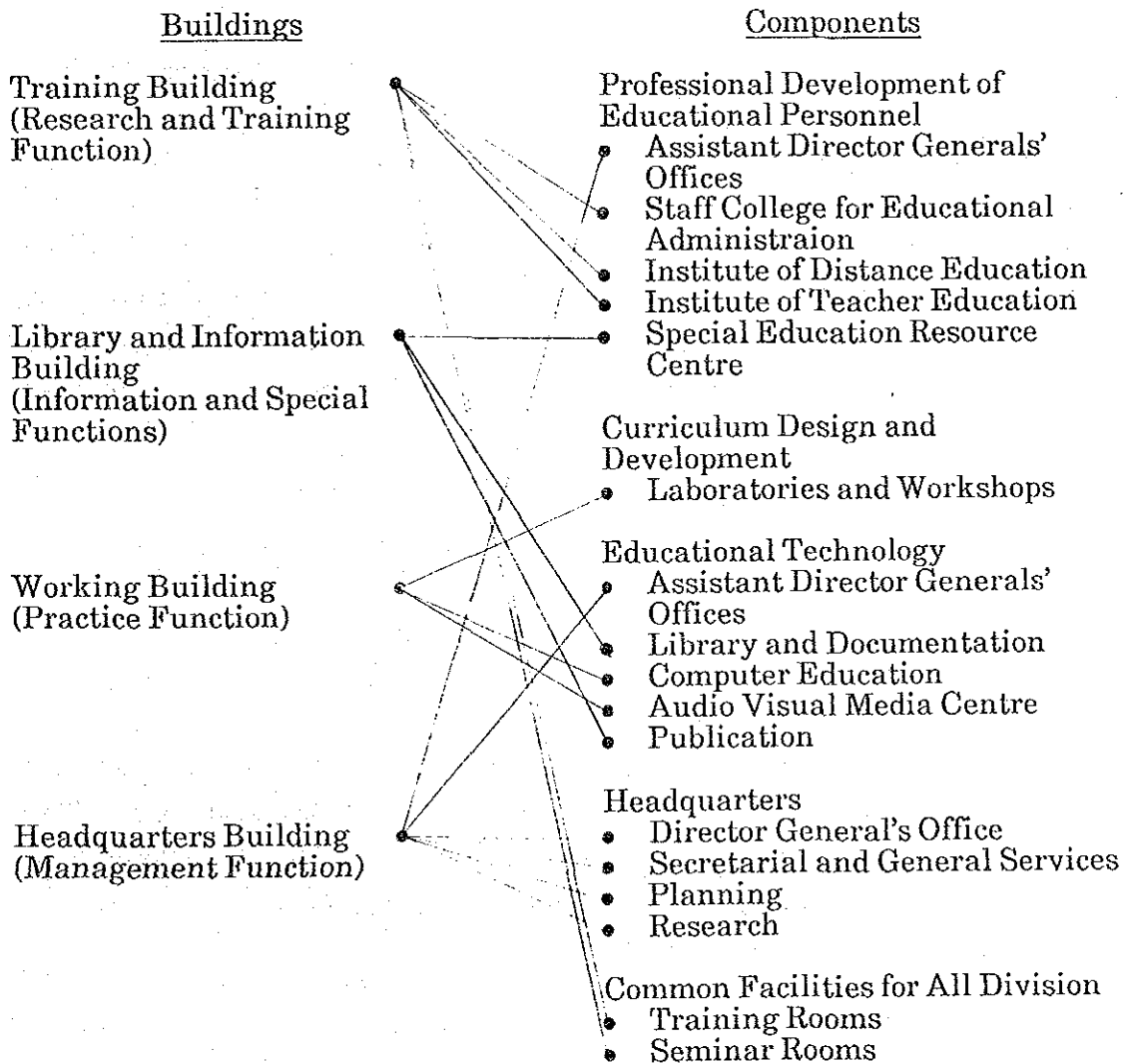
4.2 Examination of Design Conditions

4.2.1 Composition of Facilities

The planned facilities are expected to perform the 3 main functions of the NIE described in 3.2.4 and the introduction of separate buildings to house the rooms performing these functions has been judged appropriate taking the following conditions into consideration.

- The project site strongly inclines in the north-south direction with a difference in elevation between both ends of approximately 10m.
- Many open spaces, including courtyards, will be required in view of the emphasis on natural lighting and ventilation for most rooms.

The construction of the following 4 buildings is planned for convenience and for the integration of those rooms performing similar functions.



4.2.2 Facility Sizes

The design floor areas of the rooms have been decided in accordance with the personnel distribution plan and the work plan for each room taking the relevant general standards in Sri Lanka and those in Japan and the sizes of similar facilities into consideration.

- Staff Office Space

Academic Staff Offices for each division have been planned as common rooms in view of the Sri Lankan custom and the present conditions of the existing facilities. A design floor area of 8m²/person for Chief Project Officers and 6m²/person for Project Officers has been decided taking the standard in Japan for floor area and furniture distribution (separate provision) in Sri Lanka into account. The required floor area of each room has been calculated based on the planned number of persons for each room in accordance with the personnel distribution plan. Partitions between project groups will be introduced where required.

- Training Rooms and Seminar Rooms

These will be used for classroom study and the training activities of each division. While the original Sri Lankan request included training rooms and seminar rooms for each division, it has been decided that these rooms will be considered as common facilities in view of efficient use. The number of rooms and their sizes have been decided as follows based on the trainees number limit of the training courses and taking the possible increase of the number limit in the future into consideration.

Training Room (Large)	:	108 seats,	120m ²
Training Room (Medium)	:	60 seats,	74m ²
Training Room (Small)	:	40 seats,	49m ²
Seminar Room	:	20 seats,	25m ²

- Laboratories and Workshops

The provision of the following laboratory and workshops has been decided based on the activities of the Curriculum Design and Development. The following floor areas have been determined based on the equipment layout and assuming a room capacity of 30 persons given by the study on similar facilities.

Science Laboratory	:	98m ²
Domestic Science Workshop	:	98m ²

Woodwork Workshop : 98m²
 Metalwork Workshop : 98m²

I Headquarters Building <phase 1>

Room	Design Floor Area (m ²)	Remarks
◦ Headquarters		
- Rooms Related to Director General		
Director General's Room	74m ²	includes space for secretary's office
Consultants' Offices	80m ²	5 offices for consultants from abroad or domestic educational institutions
Deputy Director General's Room	49m ²	includes space for secretary's office
Office	49m ²	15 staff members (includes space for Assistant Director General)
- Rooms Related to Assistant Director Generals		
Assistant Director Generals' Room	74m ²	2 offices for Professional Development of Educational Personnel and Educational Technology
- Secretarial and General Services		
Director's Room	25m ²	
Academic Staff Office	49m ²	6 project officers
Non-academic Staff Office	25m ²	9 staff members
- Planning		
Director's Room	25m ²	
Academic Staff Offices	37m ²	7 project officers
Progress Control Room	25m ²	evaluation and management of NIE activities
(External Services of Administration and Finance)		
- Director's Room	25m ²	
Office	37m ²	3 project officers, 3 staff members
- Research		
Director's Room	25m ²	
Academic Staff Offices	116m ²	15 project officers
Non-academic Staff Office	25m ²	7 staff members
- Common Facilities		
Discussion Rooms	50m ²	25m ² x 2
Storage	25m ²	
Corridors, Stairs, Hall and Lavatories, etc.	866m ²	
Total	1,681m ²	

II Library and Information Building <phase 1>

Room	Design Floor Area (m ²)	Remarks
<ul style="list-style-type: none"> ◦ Professional Development of Educational Personnel <ul style="list-style-type: none"> - Special Education Resource Centre <ul style="list-style-type: none"> Academic Staff Offices Non-academic Staff Office Consultants' Offices Observation Rooms Visual Testing Room Audiology Lab Training Room Store Room ◦ Educational Technology <ul style="list-style-type: none"> - Library and Documentation <ul style="list-style-type: none"> Director's Room Academic Staff Offices Non-academic Staff Office Open Book Stacks and Reading Room Closed Book Stacks Data Processing Division Library Office - Publication <ul style="list-style-type: none"> Director's Room Academic Staff Offices Printing and Binding Room Plate-Making and Copy Room Layout Room Dark Room 	<ul style="list-style-type: none"> 98m² 25m² 37m² 33m² 33m² 33m² 49m² 32m² 25m² 49m² 37m² 561m² 343m² 32m² 16m² 25m² 25m² 184m² 49m² 49m² 25m² 	<ul style="list-style-type: none"> 15 project officers 4 staff members for consultants from abroad or domestic educational institutions 2 rooms includes sound proofing room 8 project officers 9 staff members housing 50,000 books ; reading room also provides private study rooms and media library housing 100,000 books 5 project officers
Corridors, Stairs, Hall and Lavatories, etc.	777m ²	
Total	2,537m ²	

III Working Building <phase 2>

Room	Design Floor Area (m ²)	Remarks
◦ Curriculum Design and Development		
Laboratories	196m ²	2 laboratories, includes space for preparation room; seating capacity of 30
Domestic Science Workshop	98m ²	includes space for preparation room, seating capacity of 30
Woodwork Workshop	98m ²	as above
Metalwork Workshop	98m ²	as above
◦ Educational Technology		
- Computer Education		
Director's Room	25m ²	
Academic Staff Room	74m ²	10 project officers
Non-academic Staff Office	25m ²	9 staff members
Computer Training Room	74m ²	has 17 personal computers for instructors and trainees
Preparation Room	25m ²	
Software Development Room	49m ²	
Consultants' Offices	49m ²	for consultants from abroad or domestic educational institutions
- Audio Visual Media Centre		
Director's Room	25m ²	
Academic Staff Offices	74m ²	12 project officers
Technical Staff Office	25m ²	7 technicians
Non-academic Staff Office	49m ²	14 staff members
Video Studio and Control Room	184m ²	
Teaching Materials Production Room	49m ²	production of audio-visual teaching materials
- Common Facilities		
Discussion Room	98m ²	49m ² × 25
Duplicating and Storage	44m ²	
◦ Common Facilities for All Division		
- Training Room		
Training Room - 1	149m ²	seating capacity of 110, includes space for control room
Corridors, Stairs, Hall and Lavatories, etc	1,121m ²	
Total	2,627m ²	

IV Training Building <phase 2>

Room	Design Floor Area (m ²)	Remarks
<ul style="list-style-type: none"> o Professional Development of Educational Personnel <ul style="list-style-type: none"> - Staff College for Educational Administration <ul style="list-style-type: none"> Director's Room 25m² Academic Staff Office 172m² Consultants' Offices 54m² Non-academic Staff Office 74m² Tutorial Room 25m² Course Materials Distribution Unit 25m² - Institute of Distance Education <ul style="list-style-type: none"> Director's Room 25m² Academic Staff, Offices 343m² Non-academic Staff Office 49m² Course Materials Distribution Unit 33m² Strong Room 16m² - Institute of Teacher Education <ul style="list-style-type: none"> Director's Room 25m² Academic Staff Offices 147m² Non-academic Staff Office 49m² Course Materials Distribution Unit 33m² Strong Room 16m² - Common Facilities <ul style="list-style-type: none"> Duplicating and Storage 49m² - Common Facilities for All Division <ul style="list-style-type: none"> Training Room-2, 3 148m² Training Room-4~11 392m² Seminar Room 1~4 100m² 		<ul style="list-style-type: none"> 27 project officers 3 rooms for consultants from abroad or domestic educational institutions 20 staff members 3 - 4 tutors 60 project officers 12 staff members for mark sheets and interview schedules 22 project officers 11 staff members for mark sheets and interview schedules
Corridors, Stairs, Hall and Lavatories, etc.	939m ²	
Total	2,739m ²	

Total of I - V 9,584m²
 Covered Way 310m²
 Elevated Water Tank 98m²

 Grand Total 9,992m²

4.3 Basic Plan

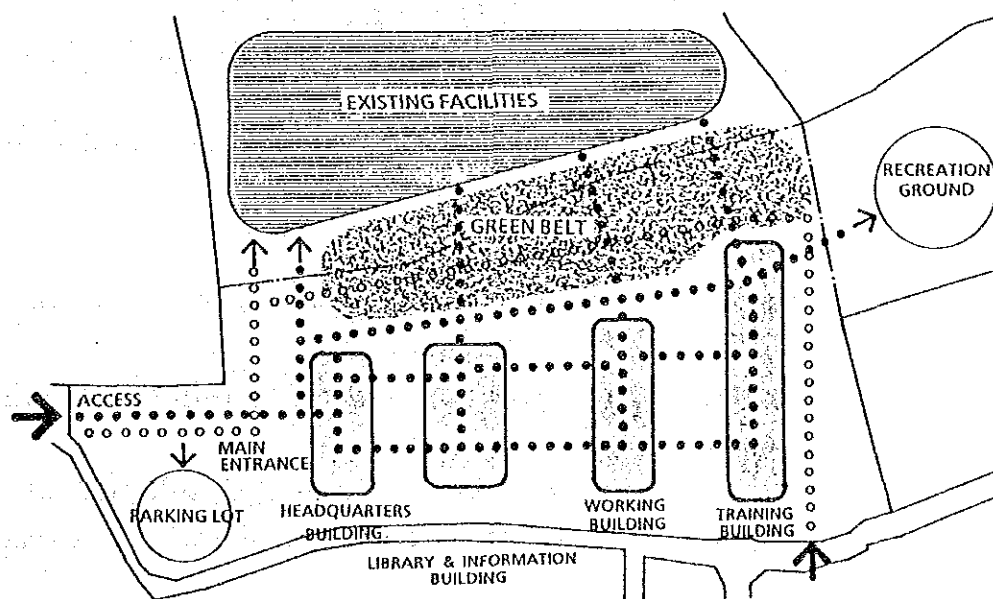
4.3.1 Building Layout Plan

The project site is the ground slopes from north to south with a fairly large difference in elevation. Particular attention has, therefore, been paid to a well-balanced building layout.

The Headquarters Building which will act as the reception for the campus, Library and Information Building, Workshop Building and Training Building will be located in this order from the north end of the project site where the access road to the Campus is located towards the south end based on the planned functions of the buildings. The main axis of each building will run in the east-west direction for maximum lighting and ventilation.

The elevated water tank of some 30m in height will be located at the central point of the above buildings to symbolize the NIE. Each building will be connected by corridor to the Headquarters Building which functions as the front door of the entire facilities, and footpaths will be introduced around the buildings for easy access to each building. In addition, a service road will be introduced along the buildings for goods delivery purposes.

Although it is not currently used for access to the Campus, a gate will be introduced along Wareketiya Road which is located to the west of the Campus in view of its use in the future. The parking space will be approximately for 30 vehicles as the required space in accordance with Japanese standard. Drains will be constructed along the southern and western perimeters of the project site to prevent the flooding of nearby housing by stormwater from the project site.



4.3.2 Ground Plan

The Headquarters Building and Library and Information Building will have central corridors to make them more compact. In the case of the Workshop Building and Training Building which are large and have many types of rooms, blocks will be introduced consisting of several rooms. These blocks will be a certain distance apart and will have individual access to the central corridor running in the east-west direction to not only ensure maximum lighting and ventilation but also to create independent characters for these rooms as well as comfortable and diverse space.

The room distribution has been decided in accordance with the functions and characteristics of the rooms, the relationship between the rooms and their effective use. The main rooms in each building will be as follows.

- Headquarters Building

- ground floor : entrance hall, director's offices and academic staff offices, etc.
- first floor : Director General's office, Deputy Director General's office, Assistant Director Generals' offices and Discussion room etc.
- second floor : Directors' offices, academic staff offices and consultants' offices, etc.

- Library and Information Building

- ground floor : closed book stacks, printing and binding room, plate-making and copy room, directors' offices and academic staff offices, etc.
- first floor : open book stacks, reading room and rooms for Special Education Resource Centre, etc.
- second floor : open book stacks, reading room, academic staff office and consultants' office, etc.

- Working Building

- ground floor : woodwork workshop, metalwork workshop, domestic science workshop and studio, etc.
- first floor : laboratories, academic staff offices, training rooms and discussion rooms, etc.
- second floor : directors' office, academic staff office, consultants' office, computer training room and software development room, etc.

- Training Building

ground floor : training rooms, etc.

first floor : training rooms, seminar rooms and academic staff offices, etc.

second floor : directors' offices, consultants' offices and academic staff, offices etc.

4.3.3 Vertical and Sectional Plan

All the buildings are planned to have 3 stories to make them easy to use and also to alleviate the demand for foundation work. The ground floor height has been determined taking the ground inclination into consideration so that the sectional plan does not demand any heavy land preparation work. A story height of 3.5m will be adopted for each floor to facilitate natural ventilation and lighting. In addition, the ceilings will be direct concrete slab ceilings for all rooms to prevent dust accumulation except those rooms requiring air-conditioning.

Latticed vent lights will be introduced for both the corridor and window sides to further improve natural ventilation and lighting and balconies will also be introduced on the window side of each room to prevent strong sunshine and rain entering the rooms. Eaves will be provided for the outside corridors vis-a-vis rain. While the rooves will be flat concrete slab rooves, ventilation blocks will be laid from corner to corner to provide sufficient heat insulation.

The vertical plan will consist of a forcible structure of square units (3.5m span and 3.5m story height) which, combined with the geometric patterns of the latticed railings for the balconies and other accessories, will give the buildings a modern appearance and make the openings of the buildings suitable for the local climate.

4.3.4 Structural Plan

In view of the uses, functions and sizes of the buildings, the case-in-place reinforced concrete type structure which is widely used in Sri Lanka and which is both a reliable and economical construction method will be adopted and local standards and past performances will be referred to in determining the design loads and design standards.

(1) Ground Conditions and Foundation Type

The surface soil of the project site is so-called laterite. There is a gravel layer with a N value (standard penetration value) of 10 - 15 some 4 - 15m below the hard surface layer (1 - 3m) of gravel and the hard bedrock is found at 15 - 17m below the surface.

In view of the construction practices employed in surrounding areas and also in view of economy, a mat foundation is planned for the buildings to be constructed under the Project. Since the above N value suggests a bearing strength of some 10 t/m², various foundation types, including independent footing, wall footing and raft footing, will be selectively used depending on the axial force and building size, etc. Particular attention will be paid to the foundation level in sloping and banked sections.

(2) Structure and Design Standards

A reinforced concrete rigid frame structure will be adopted and external and partition walls will consist of concrete blocks or bricks. In view of the general use of British standards in Sri Lanka, the following design standards will be used.

- dead load, live load	BS 6399 Part I (1984)
- wind load	BS CP3 Chapter V (1972)
- reinforced concrete structure	BS CP110 (1972)
- steel frame structure	Japan Architects' Society Design Standards

The live loads of the main rooms are as follows.

<u>(Room Type)</u>	<u>(Live Load: kg/m²)</u>
academic staff offices	306
training rooms	306
laboratories	306
offices	225

(3) Construction Materials

Construction materials will be procured locally where possible. However, those materials of which the local supply capacity and/or quality are inadequate will be imported from Japan or elsewhere.

cement	:	ordinary Portland cement
coarse aggregate	:	local crushed stones
fine aggregate	:	local river sand
reinforcing bars	:	Japanese deformed bars: SD30, SD35 (JIS G3112)
structural steels	:	Japanese H sections and light steel sections: SS41 (JIS G3101), SSC 41 (JIS G3350)

4.3.5 Building Services Plan

(1) Basic Principles

The following basic principles will be adopted for the building services plan for Project-related buildings.

- Close coordination with the intended functions of the buildings.
- Appropriate contents vis-a-vis the natural and use conditions.
- Selection of systems and equipment types which are easy to maintain.
- Employment of measures to reduce the running cost and save energy.
- Selection of equipment and materials which can be interchanged with other products and easily repaired.

(2) Electric Services

1) Initial Power Supply and Transforming Equipment

◦ Voltage and Frequency

The initial power supply to the project site will be made by branching from the high voltage aerial power cable (3-phase, 3-wire, 11KV, 50Hz) of the CEB which runs along the High-Level Road to the electricity pole on the site and then to the power room by underground cable. The necessary rewiring work of the existing power supply system for the existing buildings will be conducted by the Sri Lankan side following the completion of the Project.

◦ Power Receiving Facility

A cubicle-type power receiving facility will be installed in the power room. The 11KV high voltage power will be reduced to 400V/230V by the transformer and will then be supplied to the panel and power boards of each building. Power will also be supplied to the existing buildings. The required transformer capacity is approximately 630KVA.

Although the installation work of a transformer with a capacity of 800KVA or less can be requested to the CEB, it is anticipated to take one year or more to deliver a 630 KVA transformer, so that the Japanese side will plan to install it.

◦ Division of Work

The Sri Lankan side will be responsible for the supply of high voltage power to the project site. The work demarcation points will be the high voltage switch on the first power receiving pole on the site and the secondary side terminal of the power fuse. The Japanese side will consequently be responsible for electric services after the high voltage

switch. The provisional rewiring work to supply low voltage power (400V/230V) to the existing buildings will be conducted by the Sri Lankan side.

2) Emergency Power Supply

A battery (80AH) will be provided as the power source for the indicator lamps for the transformer and power supply, warning lamps and security lighting. In addition, a diesel engine generator (75KVA) for water pumps, fire pumps and submerged pumps will be installed in the new pump room which will be constructed on the lower ground of the project site to supply emergency power (3-phase, 4-wire, 400V/230V, 50Hz).

3) Trunk Line

Power with voltage reduced by the transformer will be supplied to the panel and power board of each building via the MCB (low voltage power distribution board) in the power room. The power supply for the trunk line and other places of use is as follows.

- | | | |
|-------------------------------|---|----------------------------|
| ① power trunk line | : | 3-phase, 4-wire, 400/230V |
| ② lighting and socket outlets | : | single phase, 2-wire, 230V |
| ③ fans and pumps, etc. | : | 3-phase, 3-wire, 400V |

4) Lighting, Socket Outlets and Ceiling Fans

◦ Lighting

Fluorescent lamps will mainly be used for lighting to reduce the running cost and incandescent lamps will also be used where necessary in view of design or special requirements. Guide lamps will be provided at the main entrances and exits of the buildings, including those of the Multi-Purpose Lecture Hall Building used by many unspecified persons. A small compartment switching system will be adopted to reduce the running cost and thinned-out lighting will be made possible for corridors and other places. The luminous intensity of the main rooms will be approximately as follows.

- | | | |
|---|---|---------------|
| ① offices and library | : | 350 - 400 lux |
| ② workshops, training rooms and seminar rooms | : | 300 - 350 lux |
| ③ hall | : | 150 - 200 lux |
| ④ corridors, lavatories and storage rooms | : | 50 - 100 lux |

◦ Socket Outlets

In addition to the ordinary socket outlets to be installed in offices and conference rooms, etc., special socket outlets with the appropriate

capacities will also be installed in the studio etc. where a large number of electrical equipment will be used. Earth work will be conducted for special equipment requiring earthing.

- Ceiling Fans

Ceiling fans will be installed in academic staff offices, training rooms, laboratories and workshops.

5) Power Facility

Power boards will be installed in all machine rooms to switch on and off such power equipment as fans and pumps. Warning lamps and buzzers will be installed in the office of Headquarters Building to warn of any abnormal power load or water level.

6) Telephone System

- Extension of Telephone Line to Project Site

An overhead cable will be extended from the existing telephone line along the High-Level Road the telephone post on the project site and an underground cable will be used to extend the line to the MDF. The wiring work for 4 trunk lines upto the MDF board will be conducted by the Sri Lankan side.

- Piping

Piping work using metal pipes will be conducted upto the relay board in each building and the telephone outlets in the main rooms. Additional telephone outlets will be provided in hallways and other places for public telephones.

- Switchboard

A digital switchboard capable of handling 200 extensions will be installed and some 100 extensions will be installed in the main rooms. The connection of this extension system to that of the existing buildings will be possible and will be conducted by the Sri Lankan side.

7) Public Address System

An amplifier and microphone will be installed in the office of the Headquarters Building for internal broadcasting, public address and time broadcasting and speakers will be provided in the main rooms. Separate internal broadcasting for each building or floor should be also be made possible.

8) Interphone System

An interphone system will be installed for the following specific purposes.

- ① maintenance (power room, machine rooms and maintenance office)
- ② reception at night or on holidays (main entrance and office of the Headquarters Building)

9) TV Outlets

Common reception TV outlets will be provided where required, including in seminar rooms and training rooms.

10) Fire Alarm System

A push-button fire alarm system with alarm bells will be provided for early warning and evacuation purposes. A display panel will be installed in the administration office showing the building in which the alarm button is pushed to activate the fire pumps.

11) Lightning Rods

Lightning rods will be provided to protect the people and buildings on the Campus.

12) Outdoor Lighting

Outdoor mercury lamps will be provided for security purposes. The automatic switching method using a timer will also be employed in addition to manual switching.

(3) Air-Conditioning and Ventilation

While natural ventilation will in principle be employed, an air-conditioning and ventilation system will be introduced where necessary in view of room functions.

1) Air-Conditioning System

The following rooms will be provided with air-conditioning.

Headquarters Building

Director General's office, Deputy Director General's office and Assistant Director Generals' offices

Library and Information Building

reading rooms, visual testing room, audiology lab., observation rooms and training room

Working Building

studio, control room, computer training room and software development room

The air-conditioning system will use air-cooling type heat pump air-conditioners. Temperature and humidity control will be considered

depending on room purposes. Special attention will be paid to the soundproof room of the Special Education Resource Centre where audiometry will be conducted to prevent air-conditioning noise and a sound standard of 40dB or less on 125 - 8,000Hz will be adopted.

2) Ventilation System

Mechanical ventilation will be provided for book stacks, dark rooms, laboratories and lavatories.

(4) Plumbing

1) Ground Water Supply

Since there is no water main in the vicinity of the project site to supply municipal water, 2 deep wells (210ℓ/min each) will be dug in order to meet the daily water consumption volume. The groundwater from these wells will be stored in 2 FRP water tanks (100m² each to cover half a day's water consumption volume) and these tanks will be installed on the ground in view of easy maintenance and better sanitation.

pumping volume : 400m²/day
well diameter : 165mm
well depth : approx. 100m

2) Water Supply System

The water consumption volume will be approximately 400m²/day. The groundwater stored in the water tanks will be pumped to the 2 elevated water tanks (30m³, equivalent to 1 hour consumption volume) and the water head should be able to provide the required water pressure for the fire plugs.

pump specifications: 100φ x 1,000ℓ/min x 60m x 18.5KW x 2 (1 of which is a reserve pump)

3) Drainage System

Sewage from the existing buildings is currently drained to septic tanks near the lavatories and then to infiltration basins following the completion of the decomposition process. No maintenance work, however, is conducted.

In comparison, stormwater and miscellaneous waste water are simply drained to ditches around the buildings and then to long holes for infiltration. Stormwater and waste water which does not infiltrate into the ground overflow to neighbouring land and further to the lowland where the wells are located, possibly affecting the well water quality in terms of the

prominent presence of colon bacilli.

Sewage and miscellaneous waste water from the new buildings will be separately drained inside the buildings and will merge outside the buildings prior to arrival at the Waste Water Treatment Plant.

Taking the locations of both the old and new buildings into consideration, it has been decided that the Waste Water Treatment Plant will be constructed on low ground to facilitate the waste water flow towards it by gravity. The treated waste water will be subject to forced evaporation on the Campus in view of the Sri Lankan request that the water quality of the shallow wells must not be damaged by the treated waste water. The drainage pipes of the existing buildings will also be connected to the sewage and waste water basins.

Stormwater on the project site will be drained by drainpipes and ditches to a regulating basin to be constructed on the lowland south of the project site via drainage channels. These channels will be constructed in such a way as to avoid any adverse effects on neighbouring houses. The overflow from the regulating basin will be discharged to the surrounding lowland and will contribute to the groundwater supply for the shallow wells. The drainage channels should be able to drain stormwater from the eastern part of the Campus which is not subject to the Project.

As there is no proper sewage system in the area, including on the project site, sewage and miscellaneous waste water from the new buildings will be treated at the Waste Water Treatment Plant to satisfy the industrial standard for waste water (BOD : 30ppm) and the planned treatment volume is 250m³/day. The Plant will consist of a sand filtration basin, regulation basin, aeration basin, sedimentation basin, disinfection basin and sludge condensation basin. The disinfected water will then be evaporated through perforated pipes on the premises. The entire Plant will utilize the gravity system to reduce power consumption.

Hard vinyl chloride pipes will be used for the drainage of sewage, waste water and stormwater in view of the acidic soil and other conditions.

◦ Estimate of Waste Water Volume

Staff	$70\text{m}^3/\text{day} \times 0.8 = 56\text{m}^3/\text{day}$
Trainees	$168\text{m}^3/\text{day} \times 1.0 = 168\text{m}^3/\text{day}$
Dining/ Canteen	$41.5\text{m}^3/\text{day} \times 0.6 = 25\text{m}^3/\text{day}$

Total	250m ³ /day
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- Treated Waster Quality (Structural Standards for Waste Water Treatment Plant, Japanese Ministry of Construction)

(Waste Water)	(Treated Water)
BOD : 220ppm	BOD : 30ppm
SS : 250ppm	SS : 90ppm
pH : 5.8 - 8.6	pH : 5.8 - 8.6

4) Sanitary Fixtures

Toilet bowls, urinals, wash basins, mirrors and sinks, etc. will be provided where necessary in each buildings. Both local and western style toilet bowls will be provided.

5) Fire-Fighting Facilities

a) The fire-fighting facilities for the Project will be planned pursuant to the Fire-Fighting Act of Sri Lanka as well as that of Japan.

b) Indoor fire plugs will be installed at intervals of 100 feet. Hoses will be of the fixed, insertion type for automatic operation.

c) Carbon dioxide fire extinguishers will be provided for the power room and machine rooms, etc. while powder fire extinguishers will be provided at intervals of 100 feet for other parts of the buildings.

d) Water inlets and outlets will be provided.

6) Gas Supply

LPG will be used in the kitchen and laboratories and gas cylinders will be separately provided for each place of use.

7) Hot Water Supply

Storage type electric water heaters will be provided to supply hot water and copper pipes will be used.

4.3.6 Construction Materials Plan

Particular attention is required in the selection of construction materials to their suitability vis-a-vis the local climate and the use of locally familiar materials and construction methods should be promoted where possible. The following materials have been planned for the buildings taking economy, durability and easy maintenance into consideration.

(1) Main Structural Materials

- Pillars, Beams and Floors ... reinforced concrete (most appropriate and widely used in Sri Lanka)
- Walls concrete blocks or bricks with mortar finish (use of reinforced concrete walls is difficult given the local technical standard relating to form work and is also costly; concrete blocks or bricks which are popularly used are the most rational choice unless reinforced concrete walls are required from the structural point of view)
- Roof Structure steels and light steels (timber is difficult to procure and has maintenance and durability problems due to possible damage by termites)

(2) Exterior Finishings

- Sloping Rooves copper plate roofing (for Multi-Purpose Lecture Hall Building and elevated water tank in view of durability, attractive appearance and originality)
- Flat Rooves ventilation blocks on top of waterproof roofing felt
- Exterior Walls spraying of acrylic resin on mortar base (in view of local repair and repainting)
- Doors and Windows Frames . Wood, aluminium or stainless steel (wood doors and vent light lattice work and aluminium window frames in view of durability)

(3). Major Interior Finishing Materials

Room Name	Floor	Wall	Ceiling	Remarks	Air-Con
Director General's Office D.D.G.'s Office	Terrazzo Tile	Paint on Mortar	Rockwool Acoustic Board		○
Director's Rm. Consultant's Rm.	ditto	ditto	Paint on Concrete		
Discussion Rm.	ditto	ditto	ditto		
Office	ditto	ditto	ditto		
Training Rm. Seminar Rm.	ditto	ditto	ditto		
Laboratory Workshop	ditto	ditto	ditto		
Course Material Production Rm.	ditto	ditto	ditto		
CPU Training Rm.	ditto	ditto	Rockwool Acoustic Board		○
Software Development Rm.	ditto	ditto	ditto		○
Studio	PVC Sheet	Paint on Perforated Plywood	Paint on Perforated Plywood	Sound Proofing	○
Special Education Training Rm.	Carpet	Wooden Panel	Rockwool Acoustic Board	Safety	○
Observation Rm.	ditto	Paint on Mortar	ditto	"	○
Reading Rm. Open Book Stacks	Wooden Flooring	Wooden Panel	Rockwool Acoustic Board	Silence	○
Closed Book Stacks	Coating	Paint on Mortar	Asbestos Cement Board	Durability	○
Printing and Binding Rm.	ditto	ditto	Paint on Concrete		
Plate Making and Copy Rm.	ditto	ditto	ditto		
Common Space					
Hall, Stairs	Stone	Paint on Mortar	Paint on Concrete		
Corridor	Cement tile	ditto	ditto	Economization	
Lavatory	Cement tile	Ceramic Tile	Asbestos Cement Board		

4.3.7 Equipment Plan

(1) Planning Principles

The basic policy for the equipment plan is to attempt the functional integration of the equipment in addition to the integration of the facilities in terms of equipment layout to facilitate common use by different divisions of the NIE which are engaged in their individual activities. Cooperation between the divisions will be strengthened and efficient training activities promoted with the avoidance of equipment duplication, efficient use of the equipment and mutual information exchange between divisions. The following principles should be adopted in the selection of individual equipment.

- 1) The equipment to be provided by the Project must be installed or used in the new buildings to be constructed under the Project.
- 2) The grade and type of the selected equipment must satisfy the activity plan of each division. Attention must be paid to the even provision of equipment for each division to avoid excessive equipment provision to any one division.
- 3) The equipment currently owned and still usable should be used.
- 4) While laboratory and workshop equipment will be provided based on the Standard Equipment List for Senior Secondary Schools issued by the MOE, other equipment will be added based on the Standard Equipment for Senior High Schools in Japan for advanced training purposes in view of the fact that the NIE provides training for teachers in active service.
- 5) The equipment to be selected must be able to be maintained by the Sri Lankan side without outside help. A sufficient number of spare parts should be provided in the case of equipment for which spare parts supply is difficult in Sri Lanka.

(2) Equipment List

The equipment to be provided on the basis of the above policy and principles is as follows.

1) Institute of Teacher Education

(Infant Audiometry Apparatus)

- | | |
|-----------------------|--------|
| · Audio Meter | 3 sets |
| · Sound Spectrographe | 1 set |

· Hearing Aid (2 types)	each 10 sets
· Infant Audiometry System	1 set
· Integrating Sound Level Meter System	1 set
(Eye-Sight Testing Apparatus)	
· Visibility Test Apparatus	1 set
· Vision Scanner	1 set
· Sample Lope	1 lot
· Thermoform	1 set
· Parkins Braller	5 sets
(Observing Video System)	
· Observation Camera System	1 set
· Portable Video System	1 set
2) Library and Documentation	
· VTR set for Media Library	6 sets
· Slide Projector for Media Library	6 sets
· Photo Copy	1 set
3) Computer Education	
(Computer Training Room)	
· Computer System for Training	17 sets
· Net-Work System for above	1 set
· Video Projector for Computer Display	1 set
(Software Development Room)	
· Computer for CAI Software development	4 sets
4) Audio Visual Media Centre	
(Studio)	
· Video Camera	3 sets
· Studio Control Room System	1 set
· U-Matic high-Band Video Editing System	1 set
· Audio Mixer	1 set

· Audio Editing Tape Recorder System	1 set
· Studio Lighting System	1 set
· VHS Video Editing System	1 set
· VHS Video Equipment for lent	3 sets
(Teaching Aid Production Room)	
· T.P. Maker	2 sets
· T.P. Aid Production Equipment	1 lot
· Drawing Machine	2 sets
· DPE Equipment for Darkroom	1 set
5) Publication	
(Printing Room)	
· Paper Guillotine Cutter	1 set
· Wire Stiting Machine	1 set
· Adhesive Bookbinding Machine	1 set
· Paper Folding Machine	1 set
(Process, Copy Room and Dark Room)	
· Printing Frame	1 set
· Plate Processor	1 set
· Process Camera	1 set
· Auto Film Processor	1 set
· Photo Copy Machine	2 sets
· Blue Print Copier	1 set
· Stencil Duplicator	3 sets
(Layout Room)	
· Word Processor	3 sets
· Layout Table	2 sets
6) Scientific Experimental Apparatus	
(Phisics)	
· Force and Motion Apparatus	1 set

· Oscillation Apparatus	1 set
· Liquids and Gass Apparatus	1 set
· Heat Apparatus	1 set
· Light Apparatus	1 set
· Sound Apparatus	1 set
· Magnetism Apparatus	1 set
· Electricity Apparatus	1 set
(Chemistry)	
· Chemistry Experimental Apparatus	1 set
· Glass Ware	1 lot
· Chemicals	1 lot
(Biology)	
· Apuarium Experimental Apparatus	1 set
· Terrarium Experimental Apparatus	1 set
· Zoological/ Plant Specimen	1 lot
7) Technical & Homemaking Apparatus	
(Home Making Practice Room)	
· Kitchen Unit for Practice	4 sets
· Refrigerator	1 set
· Cooking Instruments	1 set
· Sewing Machine	7 sets
· Dressmaking Instruments	1 set
· Work Table	4 sets
(Wood Processing Room)	
· Automatic Planer	1 set
· Circuler Saw	1 set
· Wooden Lathe	1 set
· Fret Sawing Machine	1 set
· Electric Tool Set	1 set

· Carpenter Tools	1 set
· Work Bench	2 sets
(Metal Processing Room)	
· Provision Lathe	1 set
· Milling Machine	1 set
· Hack Sawing Machine	1 set
· Welder Set	1 set
· Shearing Machine	1 set
· Press (15 ton)	1 set
· Roll Forming Machine	1 set
· Electric Tool Set	1 set
· Hand Tool Set	1 set
· Work Bench	2 sets

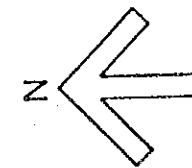
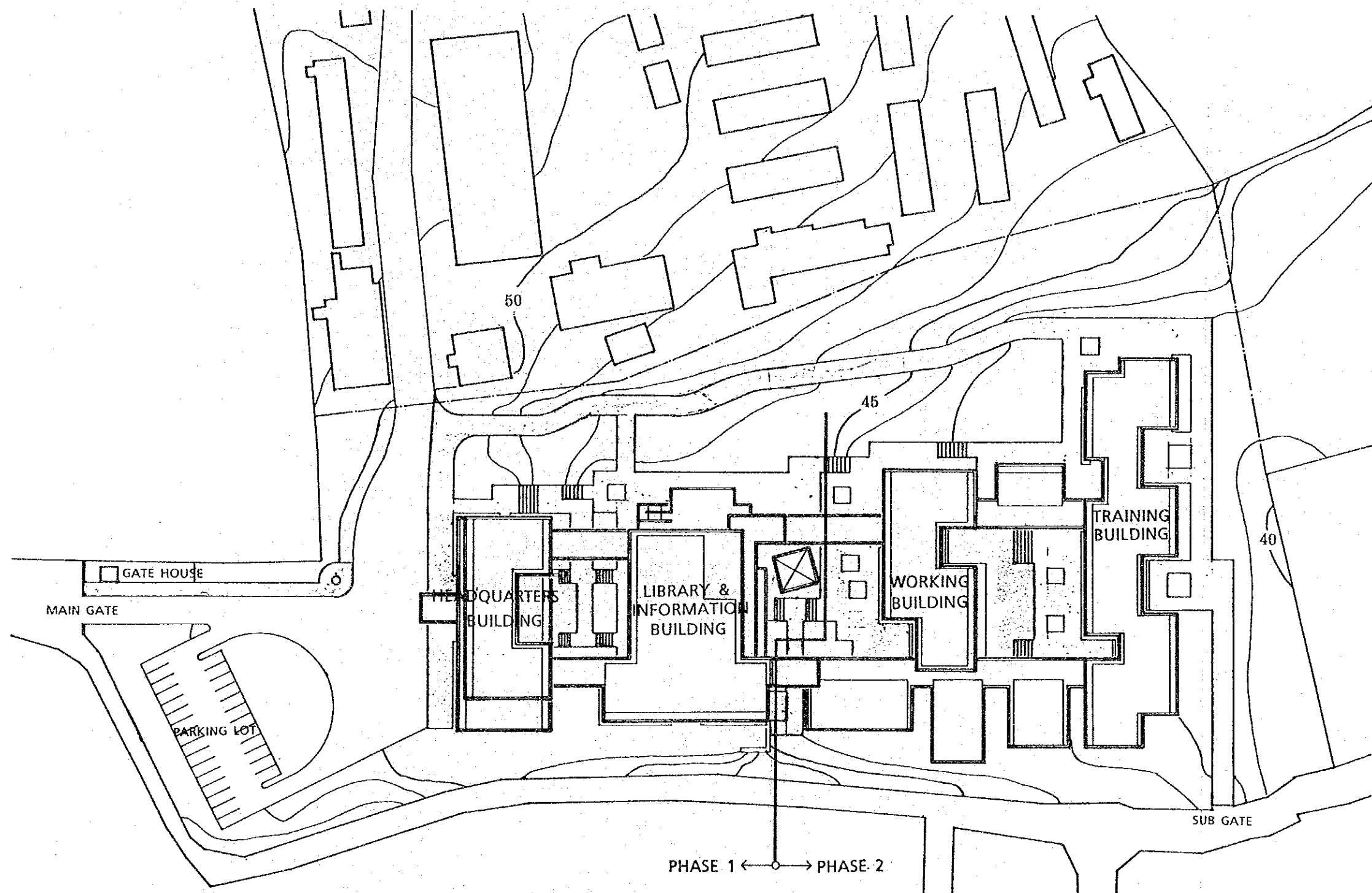
4.3.8 Basic Design Drawings

(1) Basic Design Drawings

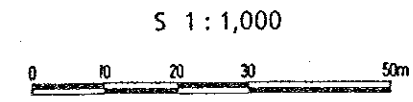
- 01 Site Plan
- 02 Level - 1 Plan
- 03 Level - 2 Plan
- 04 Level - 3 Plan
- 05 Level - 4 Plan
- 06 Level - 5~8 Plan
- 07 Elevations - 1
- 08 Elevations - 2
- 09 Sections
- 10 Tel. Elec. Suppling Plan
- 11 Plumbing Plan

(2) Floor Area Tabulation

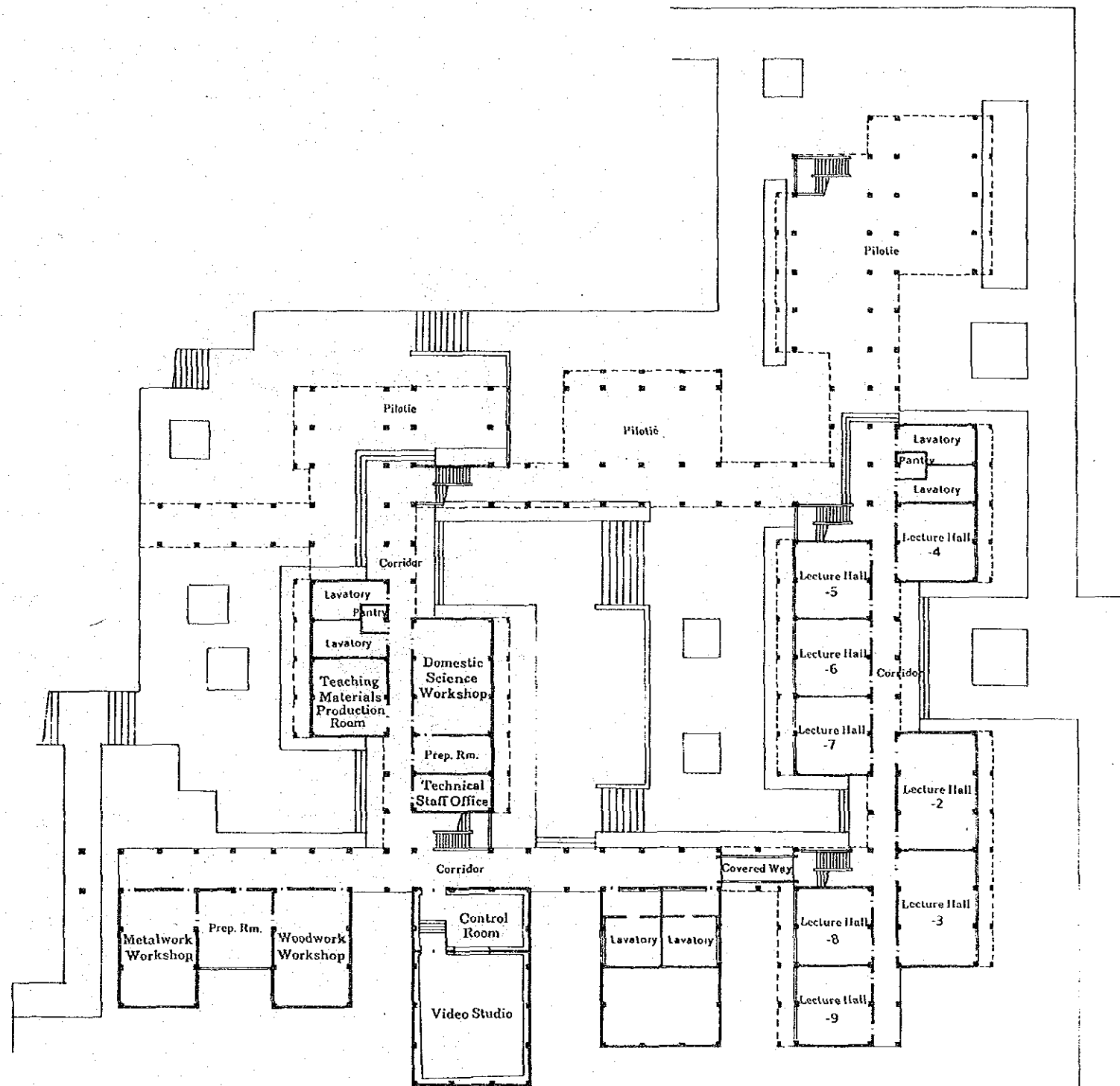
	1st Phase			2nd Phase			Total (m ²)
	Headquarters Bldg.	Library & Information Bldg.	Others	Working Bldg.	Training Bldg.	Others	
Level-1	- m ²	- m ²	- m ²	959 m ²	655 m ²	17 m ²	1,631
Level-2	-	861	-	1,126	1,107	150	3,244
Level-3	746	1,068	84	542	977	25	3,442
Level-4	501	608	34	-	-	-	1,143
Level-5	434	-	-	-	-	-	434
PH	-	-	98	-	-	-	98
S-Total	1,681	2,537	216	2,627	2,739	192	9,992
Total	4,434			5,558			



SITE PLAN



01

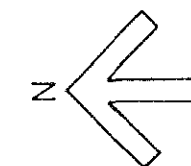


WORKING BUILDING
GROUND FLOOR

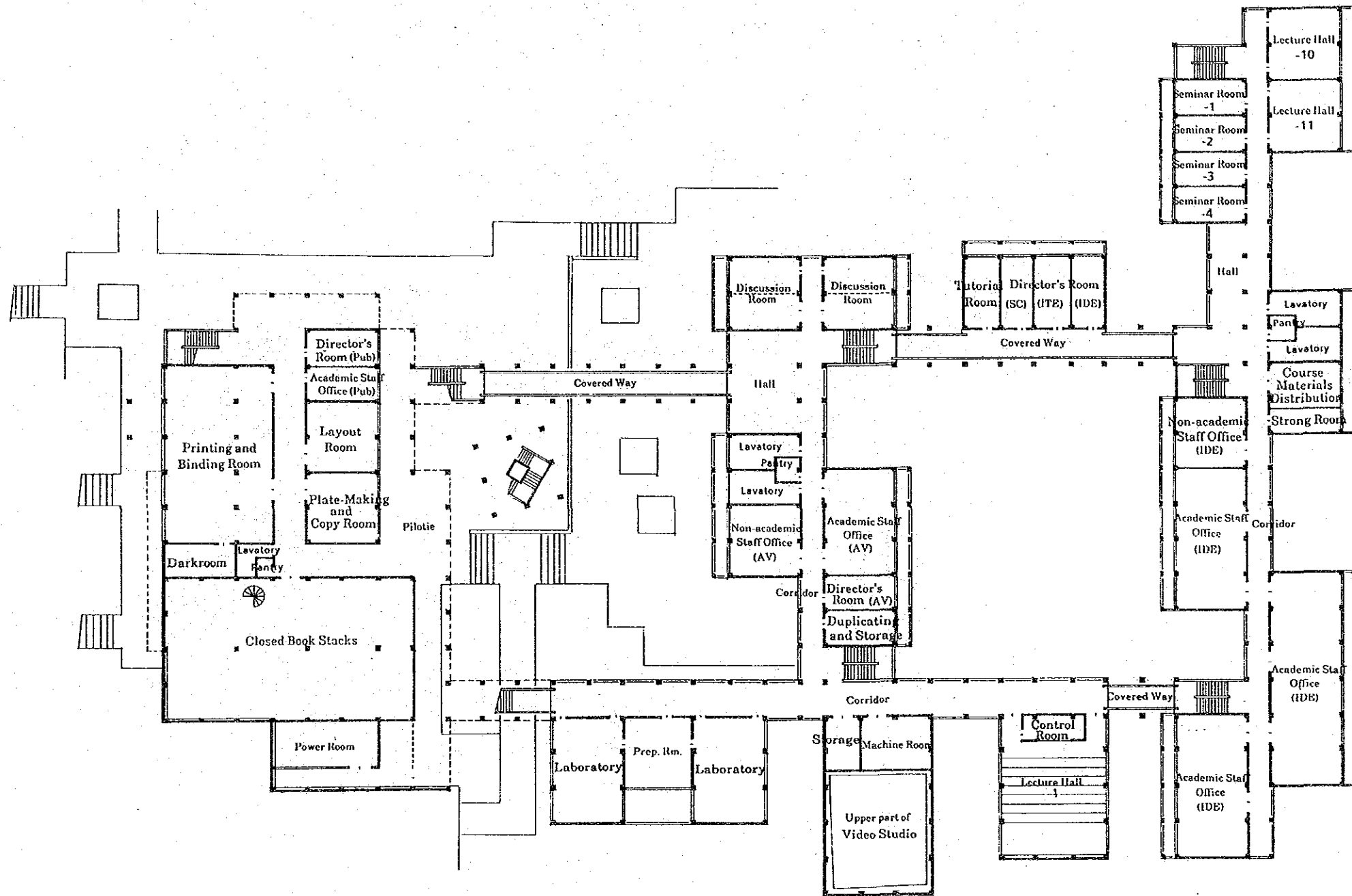
TRAINING BUILDING
GROUND FLOOR

1ST LEVEL PLAN

S 1 : 500



02

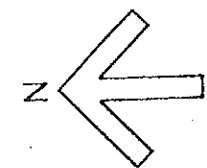
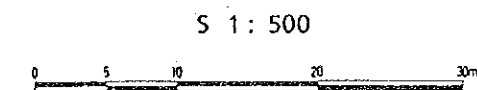


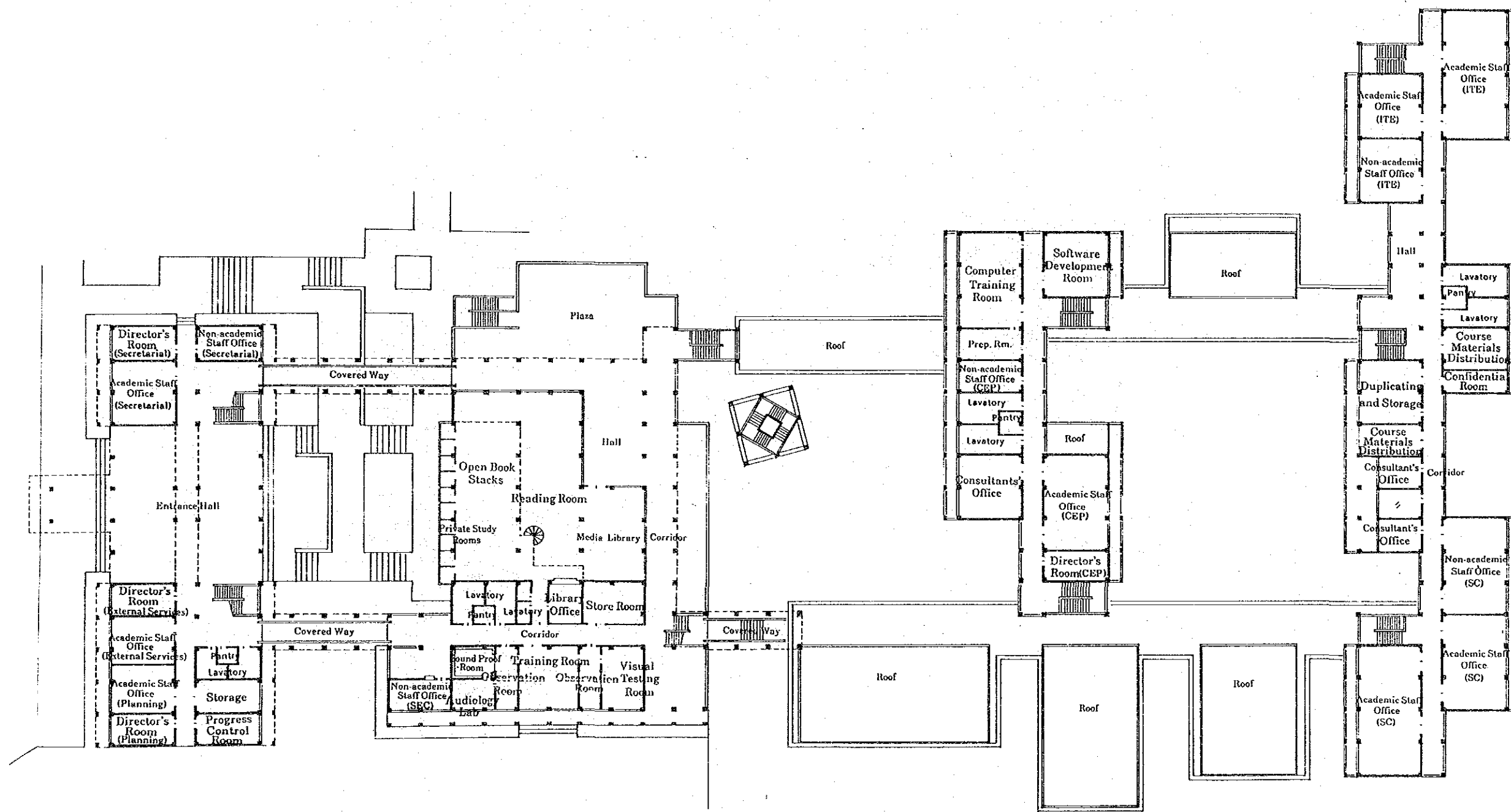
LIBRARY & INFORMATION BUILDING
GROUND FLOOR

WORKING BUILDING
1ST FLOOR

TRAINING BUILDING
1ST FLOOR

2ND LEVEL PLAN





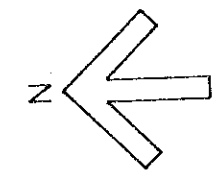
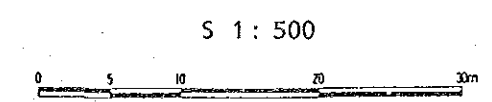
HEADQUARTERS BUILDING
GROUND FLOOR

LIBRARY & INFORMATION BUILDING
1ST FLOOR

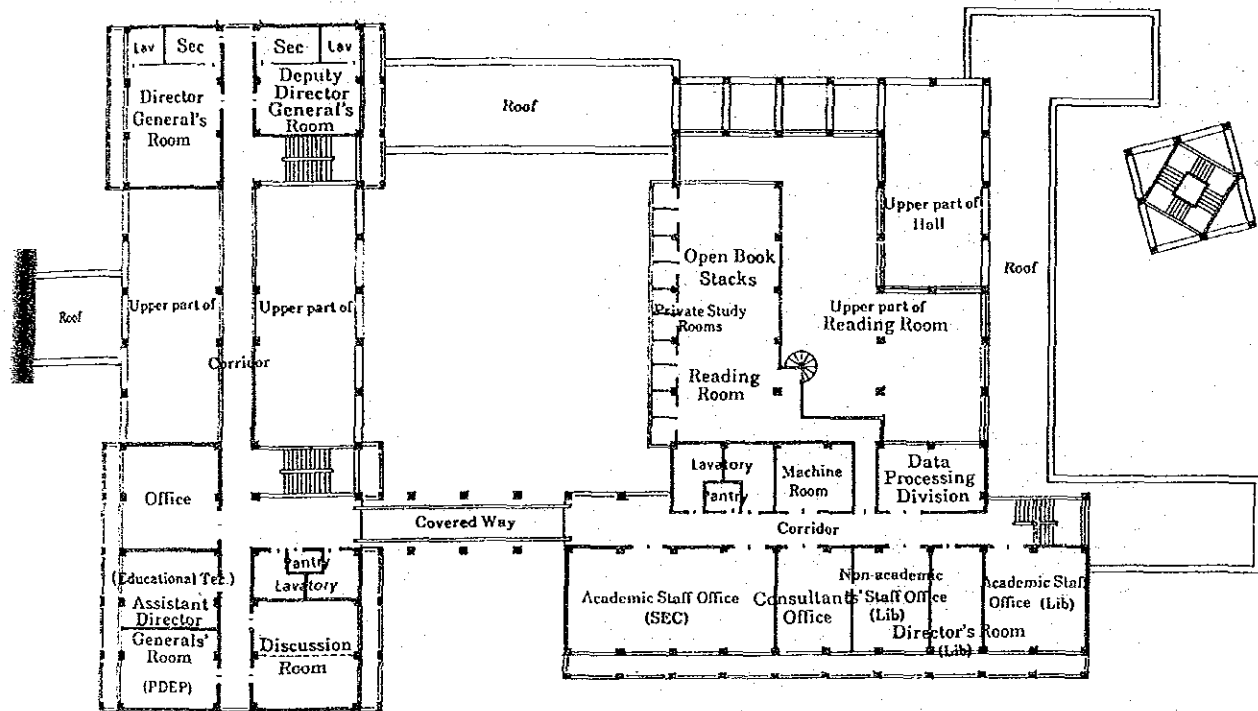
WORKING BUILDING
2ND FLOOR

TRAINING BUILDING
2ND FLOOR

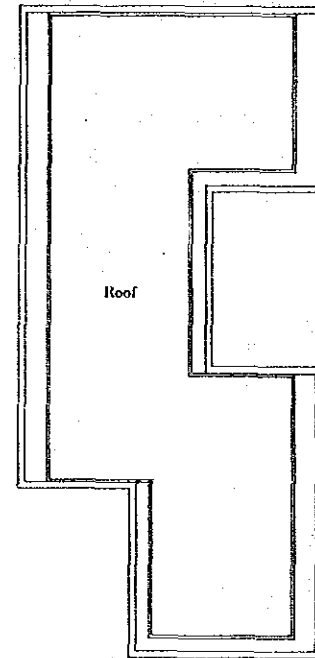
3RD LEVEL PLAN



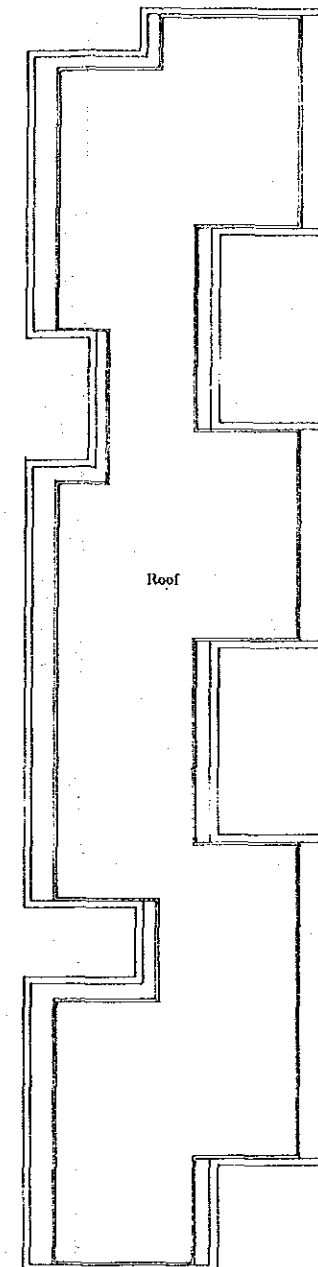
04



LIBRARY & INFORMATION BUILDING
2ND FLOOR



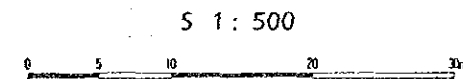
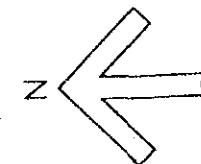
WORKING BUILDING
ROOF



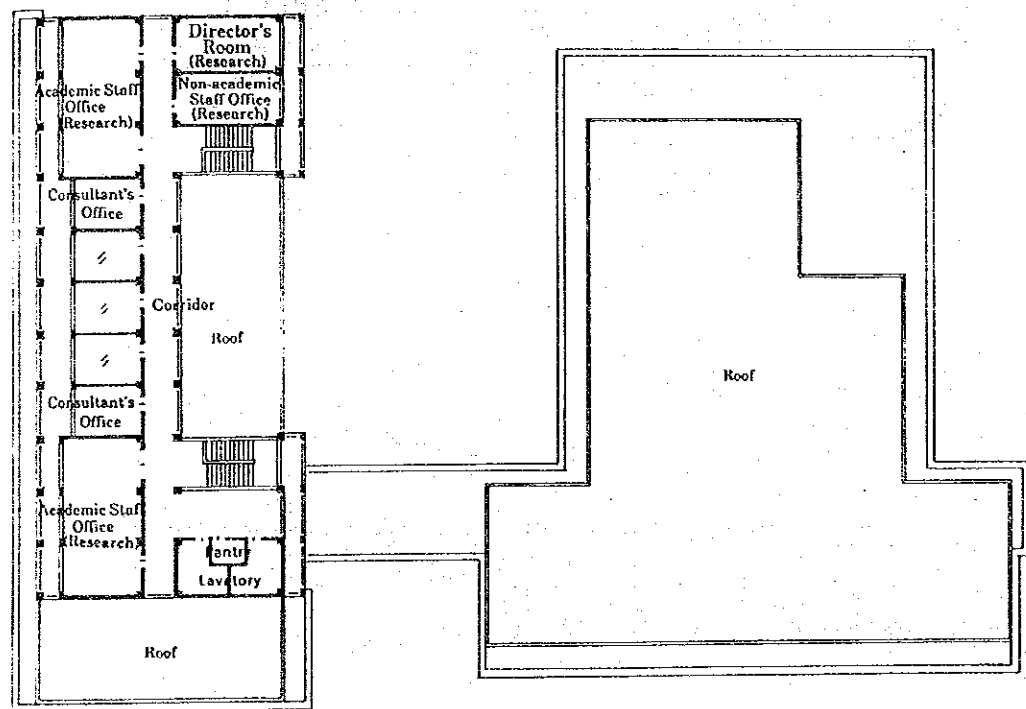
TRAINING BUILDING
ROOF

HEADQUARTERS BUILDING
1ST FLOOR

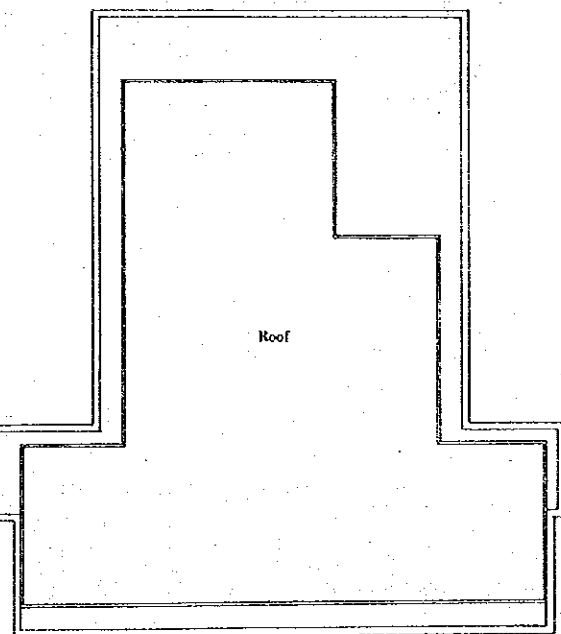
4TH LEVEL PLAN



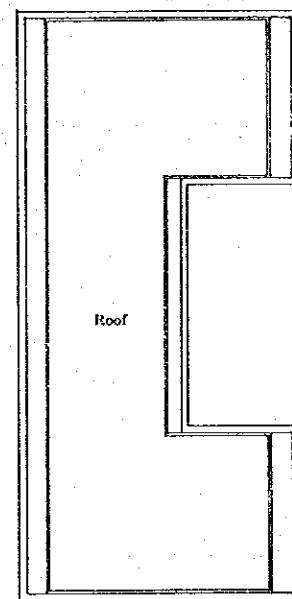
05



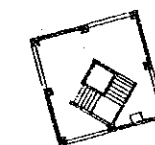
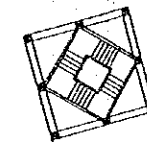
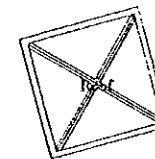
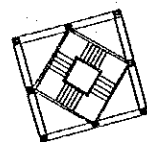
HEADQUARTERS BUILDING
2ND FLOOR



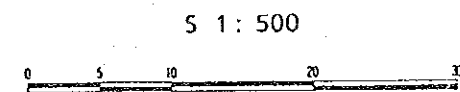
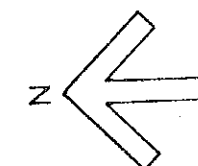
LIBRARY & INFORMATION BUILDING
ROOF



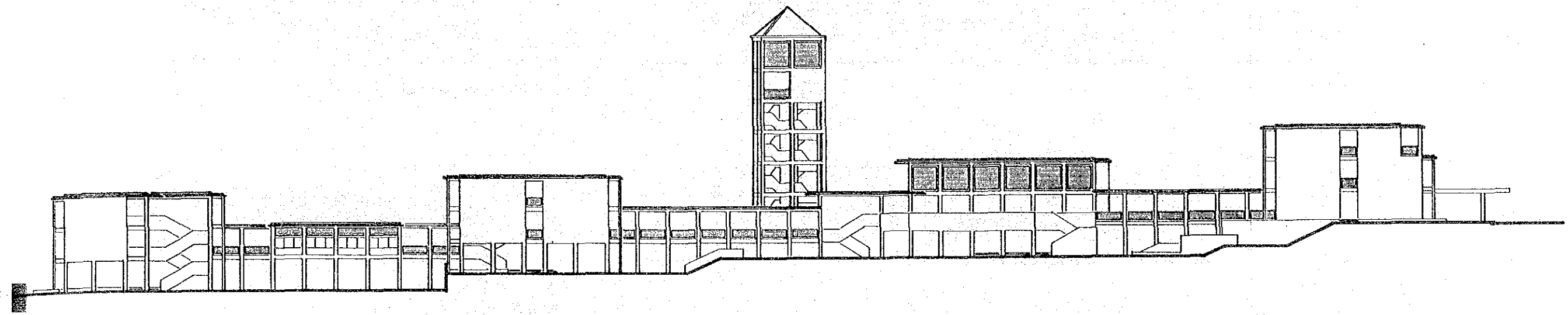
HEADQUARTERS BUILDING
ROOF



5TH - 8TH LEVEL PLAN



06



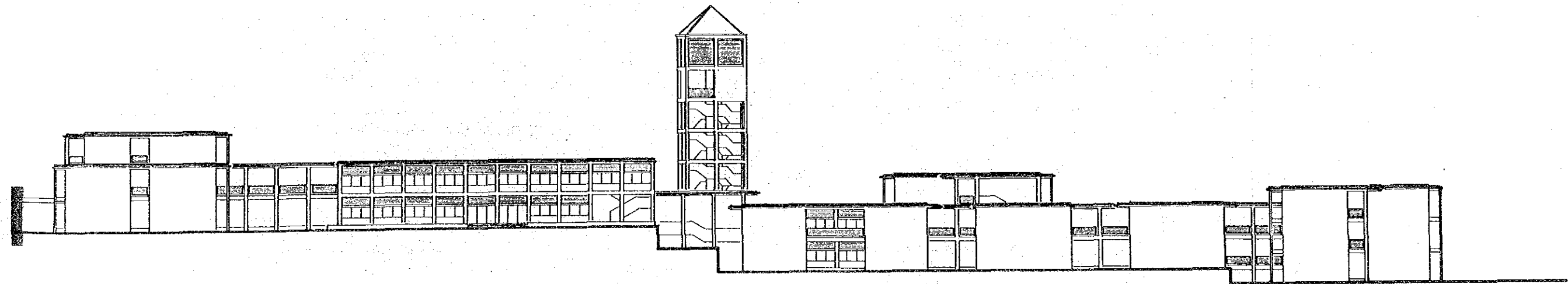
TRAINING BUILDING

WORKING BUILDING

LIBRARY & INFORMATION BUILDING

HEADQUARTERS BUILDING

EAST



HEADQUARTERS BUILDING

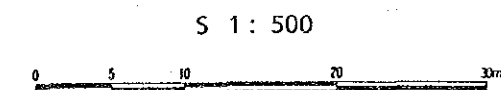
LIBRARY & INFORMATION BUILDING

WORKING BUILDING

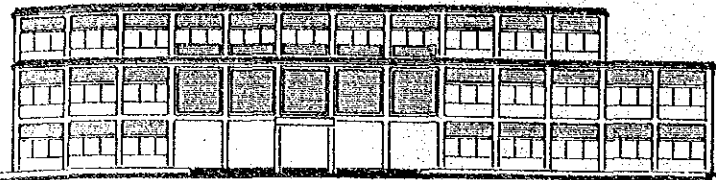
TRAINING BUILDING

WEST

ELEVATION-1



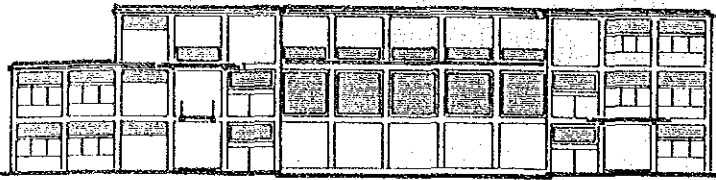
07



HEADQUARTERS BUILDING NORTH



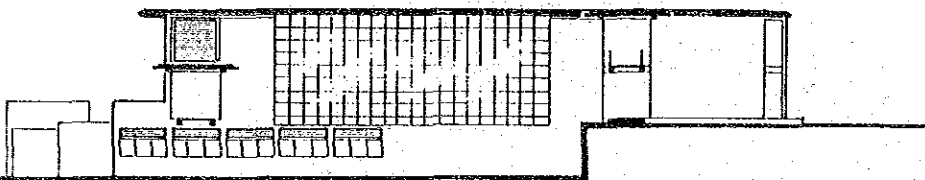
TRAINING BUILDING NORTH



HEADQUARTERS BUILDING SOUTH



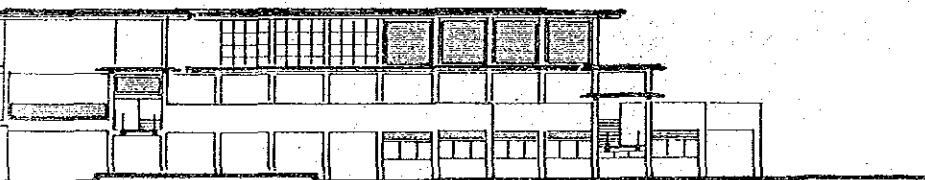
TRAINING BUILDING SOUTH



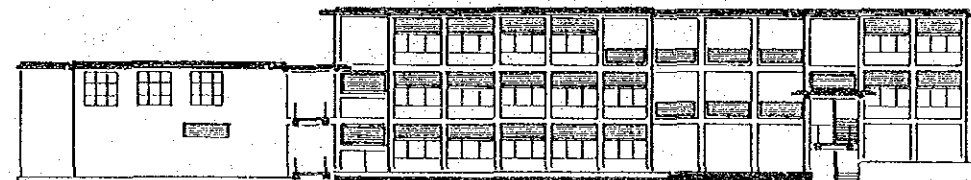
LIBRARY & INFORMATION BUILDING NORTH



WORKING BUILDING NORTH



LIBRARY & INFORMATION BUILDING SOUTH



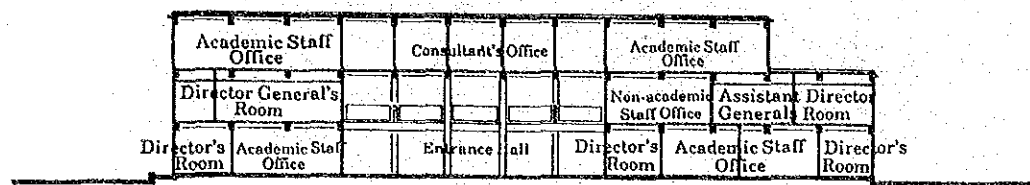
WORKING BUILDING SOUTH

ELEVATION -2

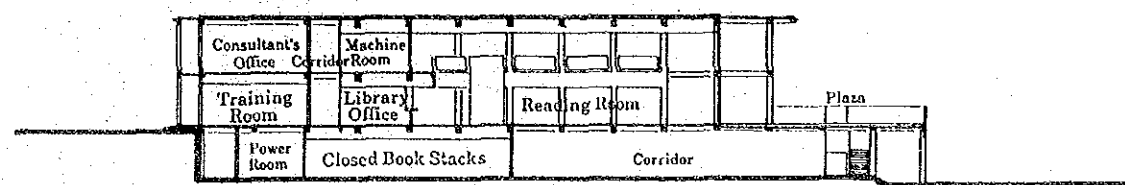
S 1 : 500



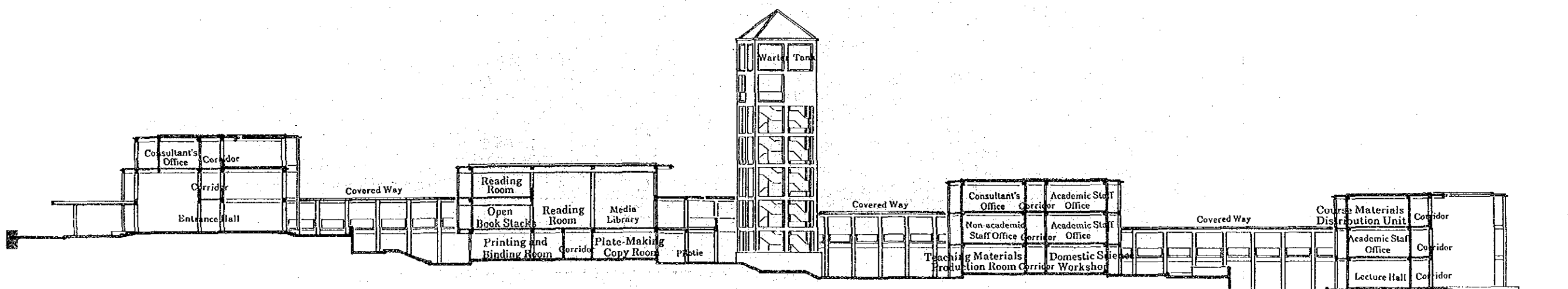
08



HEADQUARTERS BUILDING EAST - WEST



LIBRARY & INFORMATION BUILDING WEST - EAST



HEADQUARTERS BUILDING

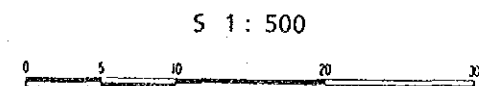
LIBRARY & INFORMATION BUILDING

WORKING BUILDING

TRAINING BUILDING

NORTH - SOUTH

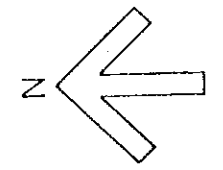
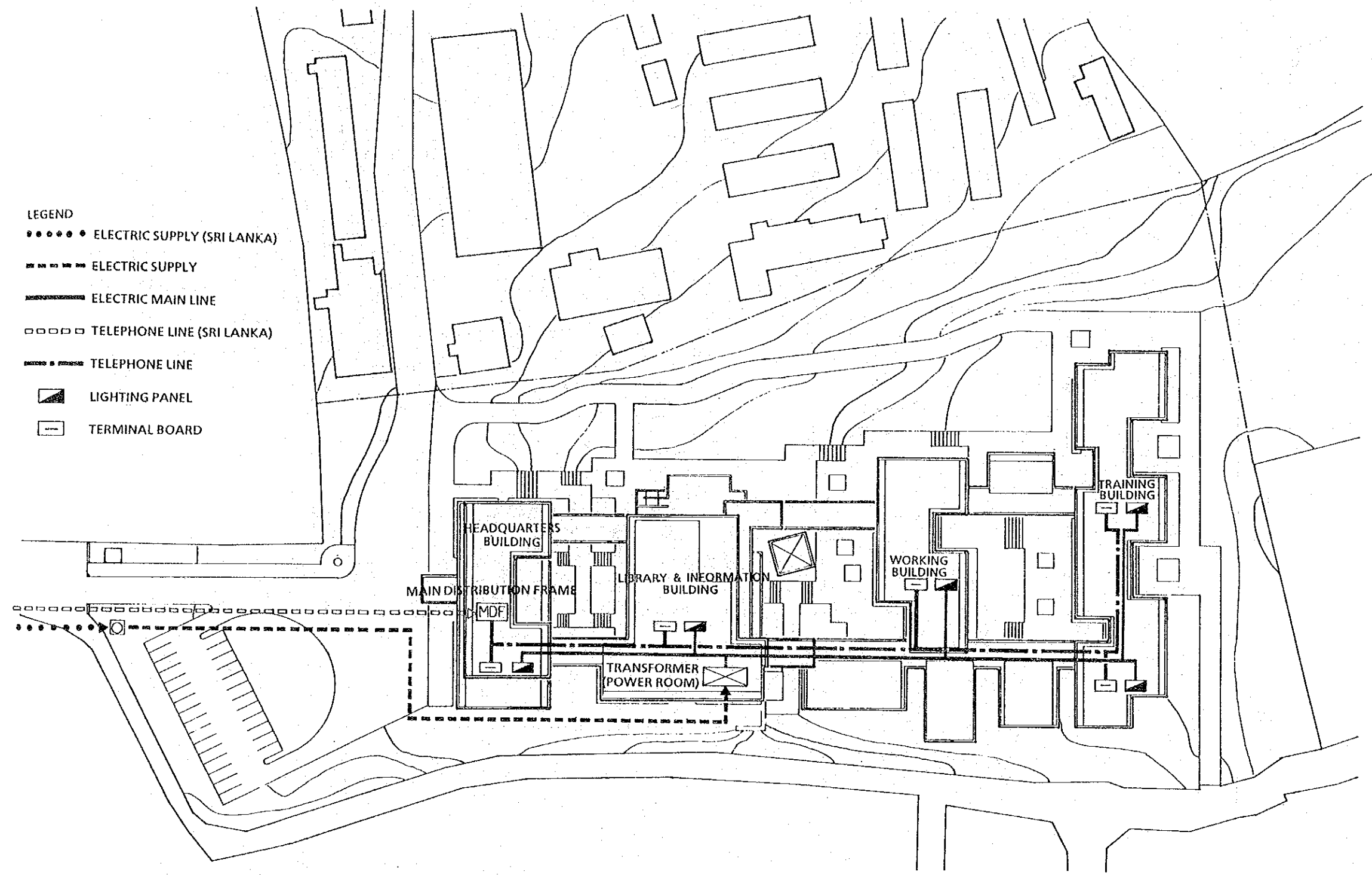
SECTION



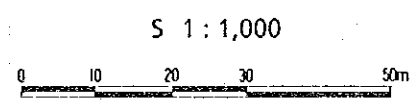
09

LEGEND

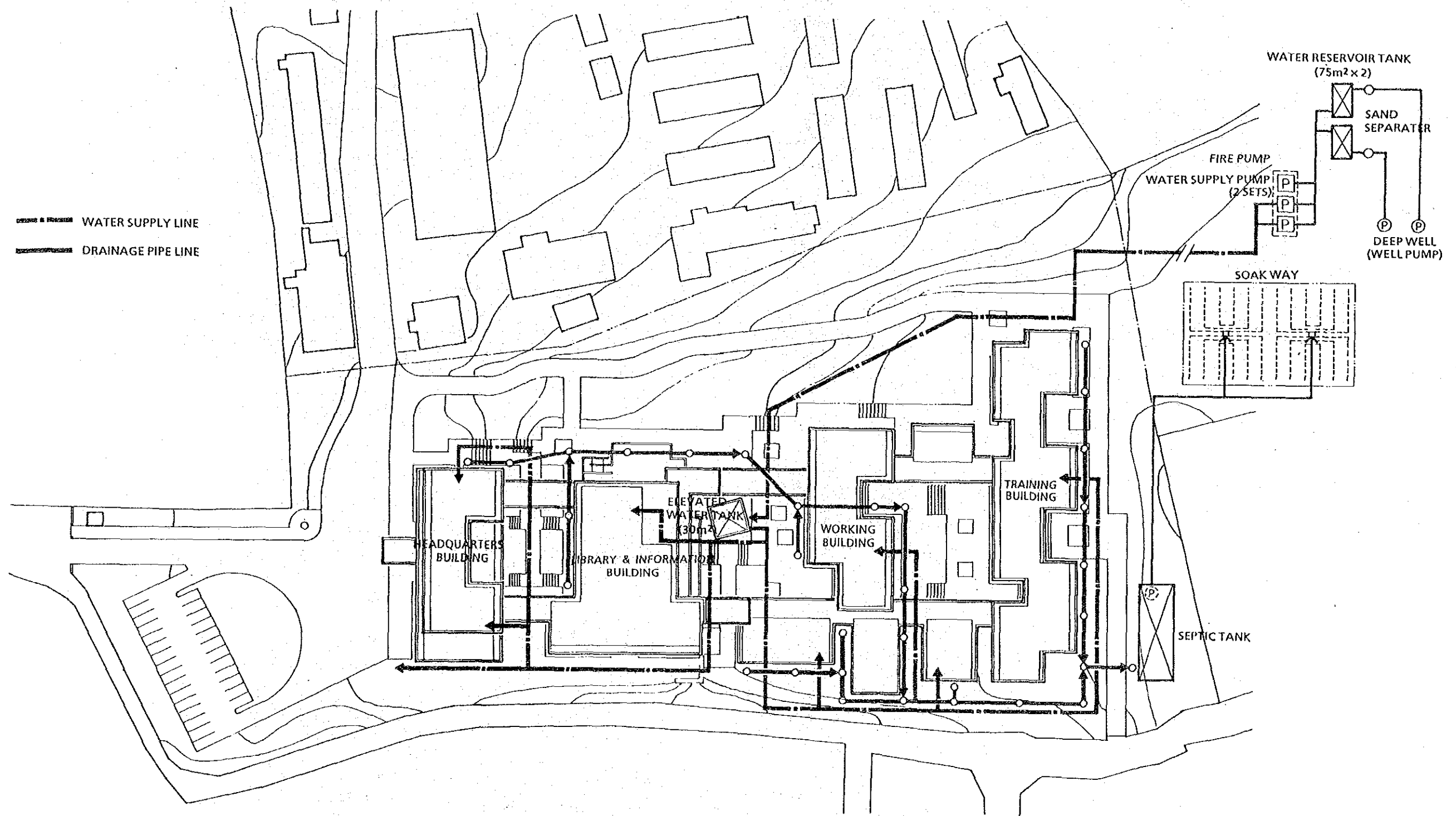
- ELECTRIC SUPPLY (SRI LANKA)
- — — — — ELECTRIC SUPPLY
- — — — — ELECTRIC MAIN LINE
- TELEPHONE LINE (SRI LANKA)
- — — — — TELEPHONE LINE
- ▣ LIGHTING PANEL
- ▢ TERMINAL BOARD



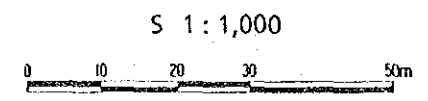
TEL., ELEC. SUPPLING PLAN



10



PLUMBING PLAN



4.4 Construction Plan

4.4.1 Background

The Project will be implemented within the framework of the grant assistance system of the Government of Japan. The Project will formally commence with the conclusion of the Exchange of Note (E/N) by the Governments of Sri Lanka and Japan. The Government of Sri Lanka will subsequently select the Consultant (a Japanese consultant) to conduct the detail design work for the facilities and equipment. With the completion of the detail design documents, the Japanese construction firm and equipment supplier who are successful bidders will conduct their respective work, i.e. the construction of the buildings and the supply and installation of the equipment. Contracts on the consultancy service, building construction and equipment supply and installation will only become effective after being verified by the Government of Japan.

4.4.2 Conditions of Local Construction Industry and Points to Note in Construction Work

As Sri Lanka is a democratic socialist country, either the Building Department or the State Engineering Corporations is responsible for all processes involved in most large public projects, from planning, design, supervision and equipment procurement to construction. As a result, the local construction industry is not fully developed and most private construction companies are treated as sub-contractors providing labour.

Sub-contractors in the construction field are not specialized as in the case of Japan and conduct various types of construction work. Since they are not fully capable of all types of work, however, it is necessary to divide orders between several sub-contractors to get the best results in the case of a large project.

While the labour force is abundant, no sub-contractor has a diverse range of skilled workers. It is not unusual to find a worker handling steel bars one day and forms the next and the technical level of the workers is consequently generally low.

There is an unfortunate tendency for those workers and engineers who have mastered new techniques and skills through on the job training by foreign construction companies to move to Singapore, the Middle East and other countries in search of better wages.

- Material and Labour Control Capabilities

With regard to various tools, the standard practice is for the required quantity to be loaned to the sub-contractors at the beginning of construction work. However, the breakage and loss rates are very high, suggesting that tighter control and supervision are required. In the case of labour management, the self control system has so far caused no serious problems.

- Quality and Schedule Control Capabilities

The local control capabilities are still inadequate in these fields, necessitating the provision of guidance by Japanese staff. With appropriate guidance and carefully planned staff assignments, however, both quality and schedule can be properly controlled.

- Technical Capabilities

In general, the number of skilled workers is small and many of them do not have their own tools. While their technical capabilities can be improved by instruction by Japanese supervisors, they may be unable to use the newly acquired skills for the next job as the sub-contractors find it financially difficult to keep them after the work has been completed. The fact that sub-contractors do not permanently employ these workers makes it difficult to find enough skilled workers when required.

In view of the characteristics of the construction work under the Project, particular attention should be paid to the following points.

- As the construction work under the Project will involve many factors which do not necessarily exist in ordinary construction work, such as building construction work, building services work, equipment work, local procurement or the import of required materials and equipment and the dispatch of skilled workers, etc., the construction plan must take care to observe the given schedule without causing any waiting time or repetition.
- Foundation work is particularly vulnerable vis-a-vis heavy rain. While dry weather can generally be expected between July and September and between December and February, the unstable weather conditions in recent years have made the commencement of the rainy season unpredictable, necessitating careful planning of the work schedule.
- As the stable supply of sand and aggregate for concrete is essential for schedule control, it is desirable that the Contractor has a concrete plant.

- The scheduled removal of the existing buildings on the project site by the Sri Lankan side is of crucial importance for the project implementation schedule.
- As some of the existing facilities will continue to operate during the construction period, protective measures for these facilities should be included in the temporary structure plan.
- As the existing electricity and water supply capacities are inadequate to meet the requirements of the construction work, the Sri Lankan side should quickly complete the necessary procedures for the project site's provision of power, water and telephone services.

4.4.3 Construction Supervision Plan

Supervision of and construction under the Project will involve the project implementation agency, the Consultant, the Contractor and the Equipment Supplier under the control of the related ministries of both governments. The work assignments of each body are as follows.

(1) Project Implementation Agency

The organization responsible for the Project on the Sri Lankan side will be the MOE and the NIE, which is part of the MOE, will be the project implementation agency. The Project will be controlled by the Construction Committee chaired by the Secretary of the MOE and all other related organizations will participate in the Committee for the smooth implementation of the Project. The NIE will be party to such agreements as the design and supervision agreement, construction and equipment contracts and banking agreement as required by the Japanese grant assistance system and will also be responsible for the work to be undertaken by the Sri Lankan side which is described in 4.4.6.

The Department of External Resources of the MOF will be responsible for any work relating to any agreement on Japanese grant assistance for the Project, acting as the competent agency for foreign assistance on behalf of the Government of Sri Lanka.

(2) Consultant

From the many Japanese consulting companies capable of handling the Project, the Government of Sri Lanka will select the Consultant to conduct the detail design work for the facilities and equipment and to prepare the tender documents through consultations with the Government of Sri Lanka taking

the contents of the Basic Design into consideration. The Consultant will dispatch a full-time supervisor to the project site at the construction and equipment installation stage to supervise the Contractors and to report on the work progress to the implementation agency and other related organizations. The Consultant will also dispatch engineers to inspect the work in accordance with the work progress. The Consultant will have the following work assignments.

- Detail Design
preparation of tender documents for construction and equipment work (detail design drawings, specifications, cost estimate, etc.)
- Assistance for Tender and Contracts
decisions on contract procedures, preparation of draft contracts, examination of detail breakdowns and selection of Contractor (preliminary qualification examination, announcement of tender, evaluation of bids, contract negotiations and witness to contracts)
- Inspection and Confirmation of Working Drawing
inspection and confirmation of working drawings, construction plans, samples of materials and finishings and building serviced and other equipment offered by the Contractors.
- Construction Supervision
examination of work plans and schedules and provision of instructions to Contractor
- Work Progress Report
report of work progress to implementation agency and other related organizations
- Assistance for Payment Procedure
examination of requisition notes payable interim and completion offered by the Contractors
- Inspection of Completed Work
inspection of work at various stages throughout the construction period

(3) Construction Contractor

The Contractor will be a qualified Japanese construction firm selected through open tender. The Contractor will complete the construction of the planned buildings on schedule based on the detail design drawings prepared by the Consultant and will hand the buildings over to the Sri Lankan side.

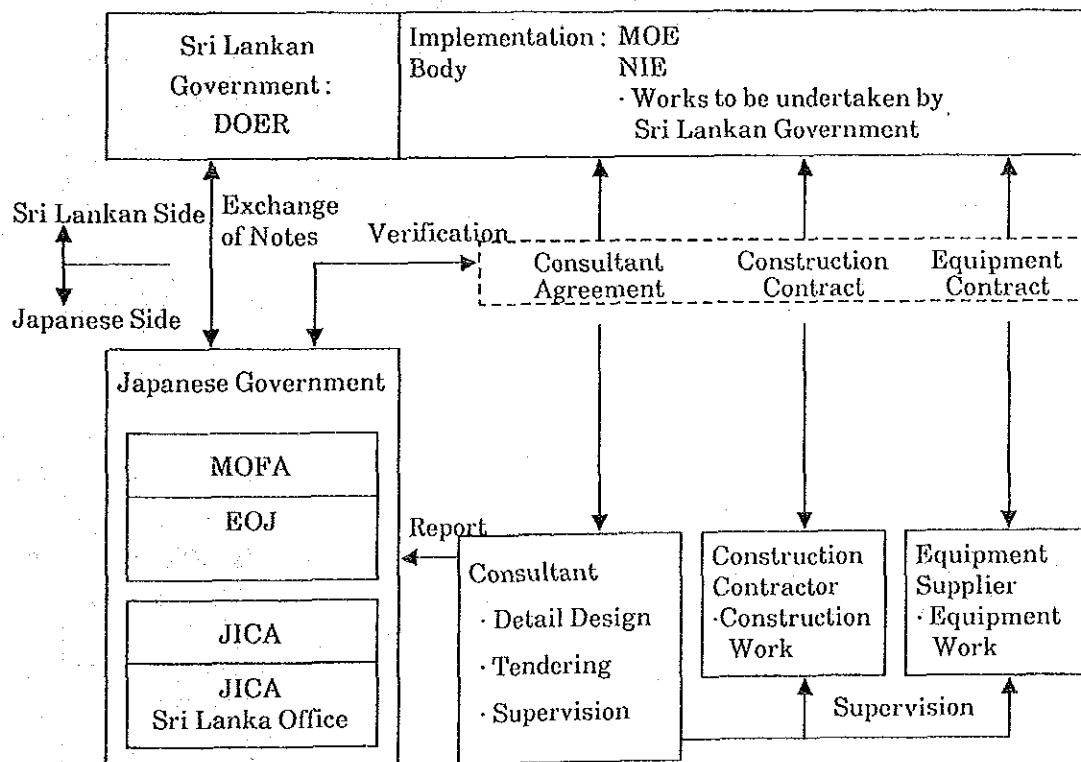
The construction work for which the Contractor is responsible will mainly consist of buildings, air-conditioning and ventilation, plumbing, electrical and exterior work and the Contractor will sub-contract the work to Sri Lankan or Japanese sub-contractors, technicians and workers as required. Some field staffs for full-time on-site construction work will be required in view of the project size and contents.

(4) Equipment Supplier

The Equipment Supplier will be a qualified Japanese trading firm selected through open tender. The Equipment Supplier will procure and install the equipment which will satisfy the specifications given by the Consultant on schedule. The Equipment Supplier will also dispatch expert engineers to the project site to assist in the installation of the equipment and to provide the Sri Lankan side with explanations on the equipment handling methods.

Based on the above work assignment division, the construction supervision system is shown below.

Supervision Plan



4.4.4 Equipment and Materials Procurement Plan

(1) Construction Materials

In principle, priority should be given to the use of local products in the construction work. However, the use of local products must be carefully examined in terms of the planned construction schedule, supply capacity, durability, workability, cost and maintenance. Based on the results of the construction materials survey conducted as part of the Basic Design Study, the procurement of the following materials is planned for the Project.

<Building Construction Work>

※ : Procure in the third countries

Equipment and Materials	Procurement in Sri Lanka	Japan and the third countries	Remarks
Cement	○	-	Periodic supply is questionable because of that the cement mill in Twincomaly has stopped operating, but imported cement is available at local market.
Sand	○	-	River sand in the catchment basin of the Kelaniya River will be used. It runs short of supply, however, at time of flooding during the rainy season.
Gravel	○	-	Crushed stone will be used.
Reinforcing Bar	-	○	As Sri Lanka depends on imports, bars made in Japan will be used.
Structural Steel	-	○	Same as above.
Forms for Concrete	-	○	Plywood forms not produced locally.
Concrete Block	○	-	Light-weight block is unavailable but no particular problem is seen. Will be used for partitioning walls.
Brick	○	-	Sun-dried bricks mainly. Unusable for face finishing. Some problem in procurement during rainy season. It will be used for partitioning walls.

Equipment and Materials	Procurement in Sri Lanka	Japan and the third countries	Remarks
Stone	○	—	Supply capacity somewhat limited but considered important as the best raw material available.
Terrazzo Tile	○	—	Few in variety and small in tip stone size but popular as flooring material locally. Durability and workability considered good.
Ceramic Tile	○	—	Manufactured by a public corporation. Few in number and type of products.
Plywood	—	○	Questionable quality. Local product is expensive.
Asbestos Cement Board	—	○	Same as above.
Lumber	—	※	Supply availability questionable as felling is restricted at present. Difficult to obtain well seasoned and dried lumber.
Metal Sashes	—	○	Not manufactured locally.
Wooden Sashes	—	※	In terms of process, procurement of wood and manufacturing are difficult.
Metal Fixtures/ Hardware	—	○	Problems in quality and available varieties.
Glass	○	○	Depend on size and thickness.
Paint	○	—	High priced but local products must be used because of future maintenance needs.
Asphalt Water Proofing	—	○	Working experience inadequate as only simple water proofing has been done.
Currugated Asbestos Slate	○	—	No problem both in quality and available quantity.
Roof Tile	○	—	Brittle as the baking temperature is low, but it is the traditional roofing material in Sri Lanka.
Furniture	○	○	Depend on quality, usage and manufacturing term.

<Air-Conditioning, Plumbing Work>

Equipment and Materials	Procurement in Sri Lanka	Japan and the third countries	Remarks
Vinyl Pipe	—	○	Not manufactured locally. Locally available pipes are too thin in wall thickness and not strong.
Steel Pipe	—	○	Local cast iron pipe questionable in accuracy.
Valve, Pipe Fittings	—	○	Large dispersion in quality and accuracy.
Pump	○	—	Procurement and maintenance is available.
Sanitary Fixture	—	○	Pose problems in maintenance as pipe jointing section being inaccurate.
Air Conditioner	—	○	Not manufactured locally.

<Electrical Work>

Equipment and Materials	Procurement in Sri Lanka	Japan and the third countries	Remarks
Transformer	—	○	Not manufactured locally.
Power Panel Board	—	○	"
Telephone Exchanger	—	○	"
Wire and Cables	—	○	"
Lighting Fixture	—	○	"
Electric Appliances	—	○	"

(2) Equipment

In principle, all the planned equipment will be procured in Japan. The procurement of the following equipment in Sri Lanka is, however, desirable in view of the supply of spare parts and the maintenance service requirements, etc. No procurement from a third country is currently planned.

- copiers
- personal computers
- typewriters

As some equipment is vulnerable to impact, high humidity and high temperatures, care must be taken in the packing and transportation of this equipment. The use of special waterproof packaging is planned for some equipment in view of the high humidity and high temperatures during its transportation in the tropics.

(3) Procurement in Japan and the third countries

Sri Lanka has no special import regulations for products for government organizations and all project-related equipment and materials imported to Sri Lanka will be exempt from taxes in accordance with the guidelines for Japanese grant assistance. Equipment procured in Japan will be transported to the project site as shown below.

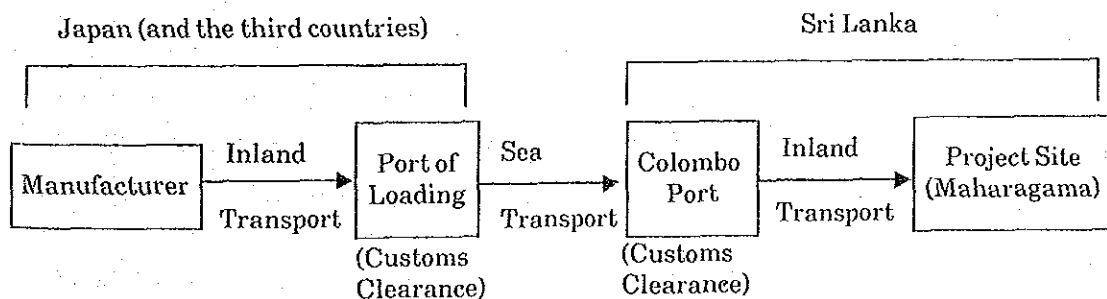
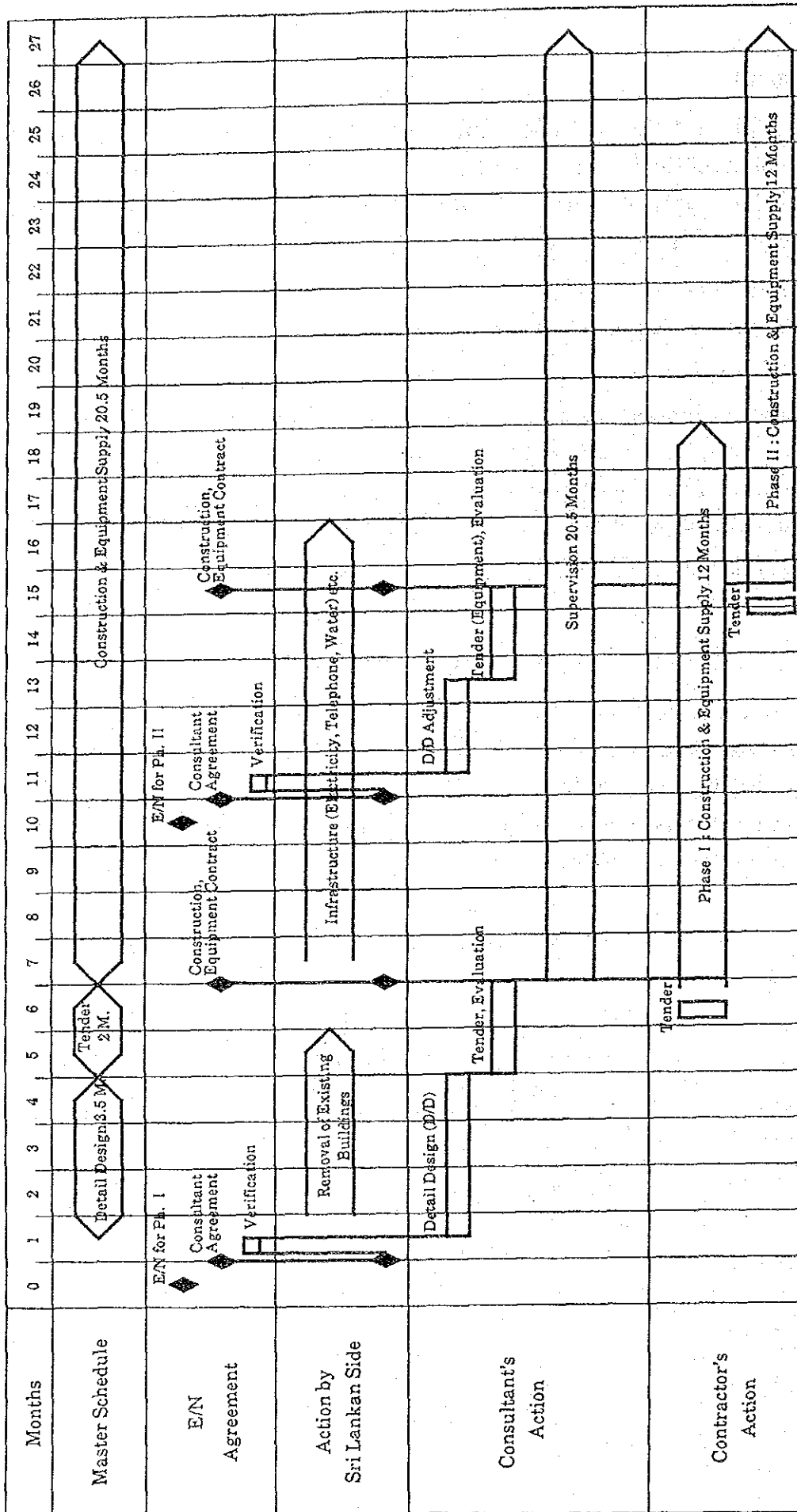


Fig. 4-4-5 Project Implementation Schedule



4.4.5 Implementation Schedule

If it is decided to implement the Project with the grant assistance of the Government of Japan, the actual construction and equipment supply work will be conducted in 3 stages, i.e. (i) preparation of detail design documents following the conclusion of the E/N by the two countries, (ii) tender and contracts and (iii) actual construction and equipment supply work.

The sizes and contents of the facilities and equipment relating to the Project suggest that the period required to complete the Project will be fairly long and, therefore, it will be reasonable to divide the construction period into 2 phases for the smooth completion of the Project.

Phase 1 : Headquarters Building and Library and Information Building

Phase 2 : Working Building and Training Building

(1) Detail Design

The tender documents will be prepared on the basis of the Basic Design and will include detail design drawings, specifications, calculation sheet and cost estimate, etc. Close consultations will be held between the Consultant and the Government of Sri Lanka at the initial, half-way and final stages of the detail design work and the tender process will commence following the approval of the final detail design by the Sri Lankan side. The period required to complete the detail design is expected to be approximately 3.5 months.

(2) Tender

Following the completion of the detail design, applications for the preliminary qualification examination will be invited in Japan. Based on these examination results, the project implementation agency will invite qualified bidders for open tender with the attendance of all related parties. If the contents of the bid with the lowest price are assessed as appropriate, the bidder will be announced successful and will conclude the contract with the Government of Sri Lanka. The period required to complete the process from tender announcement to the signing of the contract is expected to be approximately 2 months.

(3) Construction and Equipment Supply Work

Following the signing of the construction contract and equipment supply contract, the Contractor will commence the work on receipt of verification by the Government of Japan. In view of the sizes and contents of the facilities to be constructed, the period required to complete the work is expected to be 12

months for first phase and 12 months for second phase provided that the procurement of the construction materials and the work to be undertaken by the Sri Lankan side are smoothly conducted.

The project implementation schedule is shown in Fig. 4-4-5.

4.4.6 Classification of Work Responsibility

Classification of the work relating to the Project in the following manner should prove appropriate.

(1) Work to be Undertaken by the Government of Japan

- Buildings
 - Headquarters Building
 - Library and Information Building
 - Working Building
 - Training Building
- Building Services
 - water supply system
 - drainage system and Waste Water Treatment Plant
 - fire plugs
 - air-conditioning and ventilation systems
 - power receiving and transforming system and emergency power supply system
 - electrical installation
 - telephone system
- External Work
 - paving of premise road and car park
 - outdoor lighting
 - retaining walls
- Equipment
 - general training equipment
 - audio-visual equipment
 - laboratory and workshop equipment
 - printing equipment

(2) Work to be Undertaken by the Government of Sri Lanka

- *To clear level and reclaim the site.
- *To construct retaining walls and fences around the site.
- *To improve access road to the site.
- *To divert the existing in-site ditch and to improve the existing drainage system around the site.
- *To provide facilities for the distribution of electricity, water supply and other incidental facilities.
 - (a) Power distribution line to the site.
 - (b) Water supply (deep wells).
 - (c) Telephone trunk line.
- *To secure building permit and to bear its fees.
- To provide the following upon completion of the facilities.
 - (a) Landscaping.
 - (b) Exterior lightening.
 - (c) General furniture (carpets, curtains, tables, chairs and others).
- To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A.
 - (a) Advising commission of A/P.
 - (b) Payment commission.
- To ensure tax exemption and customs clearance of the products at the port of disembarkation.
- To accord Japanese Nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry into Sri Lanka and stay therein for the performance of their work.
- To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Sri Lanka with respect to the supply of the products and services under the verified contracts.

- To maintain and use properly and effectively the facilities constructed and equipment under the verified contracts.
- To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.
- To bear all the expenses necessary for relocation of the existing equipment to be used in the new facilities.

Note: Items marked with (*) should be completed before the start of construction of the facilities.

4.4.7 Project Cost Estimate

Cost to be Borne by the Government of Sri Lanka

- Demolition of Existing Buildings and Ground Preparation 2,100,000 Rs
- External Work (Landscaping) 2,200,000 Rs
- Improvement of Access road 550,000 Rs
- Provision of Substitute Facilities for Existing Buildings
(will move to the MOE Headquarters without compensation.)
- Power Distribution line to the site 300,000 Rs
- Telephone Trunk Line to the site 200,000 Rs
- Furniture and Fixtures (outside the scope of grant assistance) 1,300,000 Rs

Total 6,650,000 Rs
(approx. 25.7 million yen)

It is desirable that the Government of Sri Lanka secure the above funds in its fiscal 1989 and 1990 budget as soon as the provision of the grant assistance of the Government of Japan has been confirmed. Other required funds in relation with the grant assistance are as follows:

- Banking Arrangement Commission (0.025% of E/N amount)
- Import Tax (refer to CIF price)

CHAPTER 5 PROJECT EFFECTS AND CONCLUSION

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(1) Project Effects

The expansion of the NIE by the Project will promote the development of education in Sri Lanka. Specifically, the following effects can be anticipated.

1) Strengthening of school educational administration and management

The NIE provides training courses for personnel employment in Department and Institutions under the MOE and school principals and deputy principals to develop their management knowledge, skills and competencies. With the NIE's increased facility size and number of staff, the annual number of trainees will be increased by some 50%, from 300 to 460, widening the training opportunities for senior educational administrator. As a result, the school educational administration and management efficiency will be improved, thereby assisting a qualitative upgrading of education.

2) Strengthening of teacher education and development

Some 37% of the present primary and secondary school teachers lack a professional teacher training background and only 65% are graduates. The professional training to graduate un-trained teachers in service is conducted by the Institute of Teacher Education while the training to non-graduate un-trained teachers in service is conducted by the Institute of Distance Education. The number of qualified teachers, including those with post-graduate qualifications, will be increased with the expansion of the current training courses, strengthening the teacher training system which is essential for a qualitative upgrading of education.

In addition, courses are also planned to train teacher educators of teacher's colleges and colleges of education. The resulting upgrading of the teacher educators for teacher training courses will consolidate teacher education at these colleges.

3) Promotion of the development of curriculum and teaching materials

While the NIE has been developing curricula for primary education, language, religion and social studies, science and mathematics and technical education and also teaching materials, including those for audio-visual education mainly at its Curriculum Design and Development Centre, further development currently appears difficult due to the poor facilities and equipment and staff shortage. With facility expansion and

staff increase under the Project, these development efforts will be further promoted, contributing to a qualitative upgrading of education.

Audio-visual teaching materials are relatively new types of teaching materials with large educational effects, and their development is anticipated to promote the development of education.

4) Promotion of the provision of education with reduced disparity

At present, there is a disparity in primary and secondary education depending on the localities and size of schools. Although the different abilities of the pupils and their economic background are partially the cause of this gap, the difference in the school facilities and equipment and professional skill of teachers are the main factors. In other words, there is a difference in teaching skills between the trained teachers and un-trained teachers. By the diffusion of special education for the teaching profession through stepped up teacher training and strengthening of administration and management of school education, the provision of education with little difference throughout Sri Lanka can be promoted.

Also, expansion of research activities and teacher training in the field of special education for the handicapped will promote the provision of education for the handicapped close in substance to the education for ordinary children.

5) Expansion of NIE's activities by centralizing and expanding its facilities

As the NIE is a relatively new organization and its divisions are scattered at three different places, it lacks organic cohesiveness which has prevented it from adequately performing its activities as a unified educational training and research organization. Although NIE Maharagama, which is the main campus, has facilities, they are scattered at random and are remarkably deteriorated.

If the facilities on the NIE's Maharagama Campus were to be consolidated and expanded to have organic cohesiveness by centralizing their layout including relocation of some facilities from other campuses, the linkage among various divisions of NIE Maharagama where 90% of NIE's organs would be concentrated would be strengthened, and NIE's activities expanded thereby.

The expansion of NIE's activities will affect the activities of other organizations and invigorate the educational organizations throughout Sri Lanka.

6) Provision of Techniques and Information to Other Similar Institutes

While educational institutes in Sri Lanka, including the NIE, have their own fields of research and studies, they all suffer from poor facilities and equipment, manpower shortage and inadequate technical knowledge. The expansion of the NIE will result in the consolidation of practical research and studies and will enable the NIE to provide other similar institutes with technical know-how and data relating to educational research and studies.

7) Improvement of NIE's Coordination Capability

The technical potential of the NIE will be improved with the upgrading of the NIE's staff and the NIE's coordination capability in the field of education vis-a-vis other educational organizations will be accordingly improved.

8) Assistance for Educational Policy Decision-Making

As the NIE will be capable of conducting comprehensive research on the results of past Sri Lankan educational policies, case studies on foreign countries, comparisons between Sri Lankan educational policies and those of other countries and the social requirements for education, etc. it will be able to assist the establishment of new educational policies and guidelines by the implementation of such research.

(2) Appropriateness of the Project

The contents of the Project described in Chapter 3 have been compiled by the Basic Design Study Team based on the results of consultations with the NIE on the contents of the request made by the Government of Sri Lanka, field survey results and domestic study results. Examination of the appropriateness of project implementation in accordance with the project contents finds the Project to be feasible and appropriate from the financial, maintenance and management points of view as described below.

1) Finance

Regarding the budgetary measures for the work to be undertaken by the Sri Lankan side at its own expense which is necessary for implementing this project, the Team judged that there will be no problem as the Sri Lankan side clearly assured that the necessary budget for demolition of existing buildings and ground preparation will be secured in the special budget for fiscal 1989 and for other works to be undertaken by it in the fiscal 1990 and fiscal 1991 budgets.

Annual operation and maintenance expenses of the facilities completed under this project will amount to approximately 27.2 million Rs. Of this,

personnel expenses for employment of 87 additional staff out of the 273 planned to be additionally recruited (the staff size will be expanded from 438 persons by 1.6 times to 710 persons) has already been secured in the appropriation for the fiscal 1989 budget, and the remaining 186 persons are scheduled for employment by the end of 1991. In the fiscal 1991 budget, the ceiling for personnel expenses is planned to be 38.2 million Rs, or approximately 3.8 times that of fiscal 1988 budget of 9.9 million Rs, which is enough to cover the personnel expenses including the hiring of 273 additional staff members.

	1987	1988	1989	1990	1991
Budget for Personnel expenses (Rs.)	2,322,843	9,861,286	21,205,125	31,181,543	38,198,372

The budget for maintenance of facilities for fiscal 1992 when the facilities are scheduled for opening is planned to be 5.5 million Rs for maintenance, 2.3 million Rs for public utility totaling 7.8 million Rs. It is in excess of the 5.3 million Rs. calculated on a trial basis in Par. 3-3-5 and is considered an appropriate amount.

	1988	1989	1990	1991	1992
Budget for Maintenance	327,372	603,180	820,377	3,514,601	5,465,896
Budget for Public utility	1,549,751	1,616,575	1,890,707	2,024,300	2,325,108

The budget plan for the entire NIE is as per Table 3-2-3 previously shown, according to which 225 million Rs is planned for the fiscal 1992 budget, which is almost twice the 109 million Rs appropriated for the fiscal 1988 budget. Thus, it is judged that there will be no problem in securing the necessary amount for administration, maintenance and operation.

2) Maintenance

Special consideration has been given in the selection of the facilities and equipment to be provided to minimizing the maintenance cost, including the provision of large quantities of spare parts, the procurement of which is difficult in Sri Lanka. In the case of equipment, that equipment which can be maintained and repaired in Sri Lanka has been selected where possible. The NIE has long experience in maintaining the equipment currently in its possession. As the equipment to be provided by the Project corresponds to

the technical level of the NIE's maintenance staff, it will be possible to operate and maintain the equipment after a short training period.

3) Management

In order to expand NIE's training and research activities conducted to date, its current staff of 438 persons is planned to be increased to 710 persons by the end of fiscal 1989. The increase of new staff members is scheduled to be accomplished by transferring the personnel under the supervision of the MOE and by recruiting outside applicants. Employment of 87 academic staff members has been already decided on internally in April 1989, and employment of the remaining personnel is scheduled for completion by the time facility expansion will have been completed. As consolidation of operating arrangements including the hiring of new staff members will be completed by the time the facilities have been expanded and instructions on handling of the facilities and equipment will be given to the personnel directly responsible for their maintenance and operation at the time of their delivery, no problem is foreseen in their operating arrangements after delivery.

(3) Conclusion

The National Institute of Education (NIE), the main campus of which is located in suburban Colombo at the former Maharagama Teachers' College campus, was opened in January, 1986 to integrate the various organizations related to educational research, teacher training and teaching material development under the supervision of the MOE which were scattered in various locations at that time to promote the development of education in Sri Lanka. The purpose of this integration was the efficient coordination of such diverse activities as curriculum development for the promotion of primary and secondary education, the training of teachers and educational administrators and the adoption of new media as part of the educational activities, etc. by the central locationing of all the relevant organizations while also aiming at the further expansion of these activities.

In view of the fact that no expansion of the NIE's activities can be expected with its present facilities, equipment and staff members due to facility and equipment deterioration and shortage, the Project for Expanding the National Institute of Education and has been prepared by the Government of Sri Lanka and it is expected that the Project will not only contribute to a qualitative improvement of primary and secondary education in Sri Lanka through the consolidation and expansion of the NIE's training and research activities but

will also contribute to the fostering of capable manpower, thereby promoting sound economic development in Sri Lanka.

In view of the Project's expected contribution to the Sri Lankan economy and society, the provision of grant assistance for the Project by the Government of Japan is deemed appropriate. Furthermore, as appropriate manpower and financial provisions have been made on the Sri Lankan side in regard to the implementation of the Project and the operation of the NIE, no problems are anticipated in these aspects. The smooth and effective implementation of the Project will be further facilitated by the implementation of the following proposals.

(4) Proposals

1) Systematic Operation and Activities

- As the proper evaluation of research and training results further promotes and improves research and training activities, it is desirable that the Planning Section develops research and training evaluation methods.
- As well coordinated cooperation between the NIE's divisions will result in multiplying effects beyond the intended effects of the Project, it is desirable that the NIE prepare an operation plan to achieve such cooperation.

2) Cooperation with Related Institutes

- The active exchange of information and data with other similar institutes local and foreign will be required to consolidate the activities of the NIE.

3) Maintenance and Operation

- In view of the efficient operation of the NIE, it is desirable that the Sri Lankan engineers responsible for the maintenance and operation of the facilities and equipment participate in their installation to obtain an understanding of the characteristics and functions prior to the handing over of the facilities and equipment to the Sri Lankan side.
- As the maintenance and operation cost for the facilities and equipment could seriously affect the research and training activities, it is desirable that an adequate budget for maintenance and operation be allocated to maximize the use of the facilities and equipment owned by the NIE.

4) Measures and Work to be Undertaken by Sri Lankan Side

- It is hoped that such processes as tender, contract, banking

arrangement and customs clearance, etc. will be quickly completed for the smooth implementation of the Project.

- It is hoped that the site preparation work, including the removal of the existing buildings from the project site, will be completed prior to the commencement of the work by the Japanese side. It is also hoped that landscaping and the procurement of furniture and fixtures will be completed prior to the completion of the Project.

5) Operation Budget

- As the activities of the NIE will be largely dependent on the size of the financial provision made by the central government, it is extremely important that an appropriate budget be secured vis-a-vis the operation of the NIE.

6) Technical Cooperation

- It is desirable that technical cooperation also be provided by sending experts from Japan to Sri Lanka in view of making the NIE function more efficiently.

APPENDIX

1. Member of the Study Team
2. Interviewed Persons
3. Minutes of Discussions
4. Proposed Equipment List for Basic Design
5. NIE Activities (1986~1988)

1. Member of the Study Team

1. Member of the Study Team

1-1. The Basic Design Study Team (February 18 ~ March 9, 1989)

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Architectural Designer	Mr. Tadashi Matsubara Kume Architects-Engineers
Mechanical & Electrical Planner	Mr. Shigeru Nakabayashi Kume Architects-Engineers
Equipment Planner	Mr. Shuhei Kubota Kume Architects-Engineers

1-2. The Draft Final Report Explanation Team of the Basic Design Study
(June 8~June 16, 1989)

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Mr. Shuhei Kubota
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2. Interviewed Persons

2. Interviewed Persons

● Concerned Persons on the Sri Lankan Side

Ministry of Finance and Planning

Mr. Senarat Weerapana Assistant Director, Department of External Resources

Ministry of Education, Cultural Affairs and Information

Mr. W.J.M. Lokubandara Minister
Ms. Sunethra Ranasinghe State Minister of Education
Mr. Walter Laduwahetty Secretary
Mr. A. P. Abeysinghe Director of School Works
Mr. D. Amarasinghe Project Manager, [ADB] Rehabilitation Project
Ms. Saroja Lokuketagoda Architect, School Works Branch

National Institute of Education

Mr. D. A. Perera Director General
Mr. A. Subasinghe Secretary
Mr. M. A. De Silva Assistant Director General,
Curriculum Design & Development
Mr. W. S. Perera Assistant Director General,
Evaluation & Technical Education
Mr. J. P. Herath Director, Science and Mathematics
Ms. C. M. Abhayadeva Director, Primary Education
Dr. S. D. L. Amaragnasekara Director, Institute of Distance Education
Dr. (Ms.) P. K. D. P. Kudaligama Director, Institute of Teacher Education
Mr. N. A. C. Gunatilake Director, Audio Visual Media Centre
Ms. W. P. P. Abeydeera Director, Planning

Mr. C. M. Ariyawansa	Director, Sri Lanka Staff College for Educational Administration
Mr. G. Wijesuriya	Director, Evaluation
Ms. Lakshmi K. Cumararatunge	Director, Higher Institute for English Education
Mr. T. D. D. Gunasekera	Director, Library and Documentation Services
Mr. U. S. P. Senaratna	Director, Technical Education Project
Mr. A. S. Weeraratne	Director, Administration
Mr. P. G. R. C. Piyadasa	Director, Engineering Services
Mrs. Fernando	Deputy Director, Staff college for Educational Administration
Mr. G. R. Kumarasiri	Deputy Director, Computer Education
Mr. A. D. Gunasekera	Chief Project Officer, Institute of Teacher Education
Mr. P. K. Palangasinghe	Chief Project Officer, Technical Skills
Mr. N. G. Kularatna	Chief Project Officer, Research
Mr. C. N. Fernando	Chief Project Officer, Science & Mathematics
Mr. A. D. Fernando	Chief Project Officer, Science & Mathematics
Mr. R. Francisco	Project Officer, Agriculture
Mr. B. L. Rajapaksa	Academic Head, Special Education Unit

Others

Mr. Ranil Wickramasinghe	Minister of Industries (Former Minister of Education)
Mr. E. L. Wijemanna	Former Secretary, Ministry of Education

● Concerned Persons of the Japanese Side

The Embassy of Japan in Sri Lanka

Mr. Toshihisa Takada	Councilor
Mr. Masashi Sakuramata	Second Secretary
Mr. Ei Kubota	Second Secretary

JICA Sri Lanka Office

Mr. Hideo Yasuki	Resident Representative
Mr. Hiroshi Niino	Assistant Resident Representative

NIE

Mr. Tetsuro Arakawa	Expert on Education of Hearing-impaired Children
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