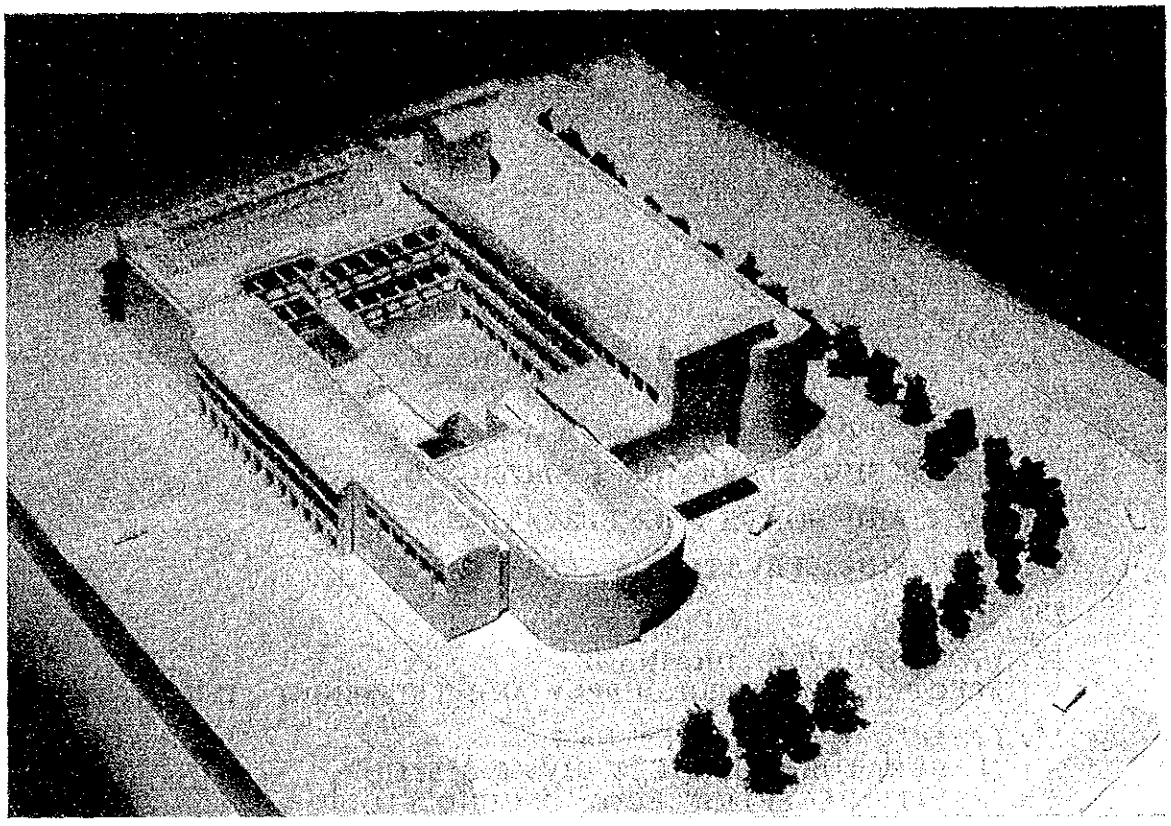
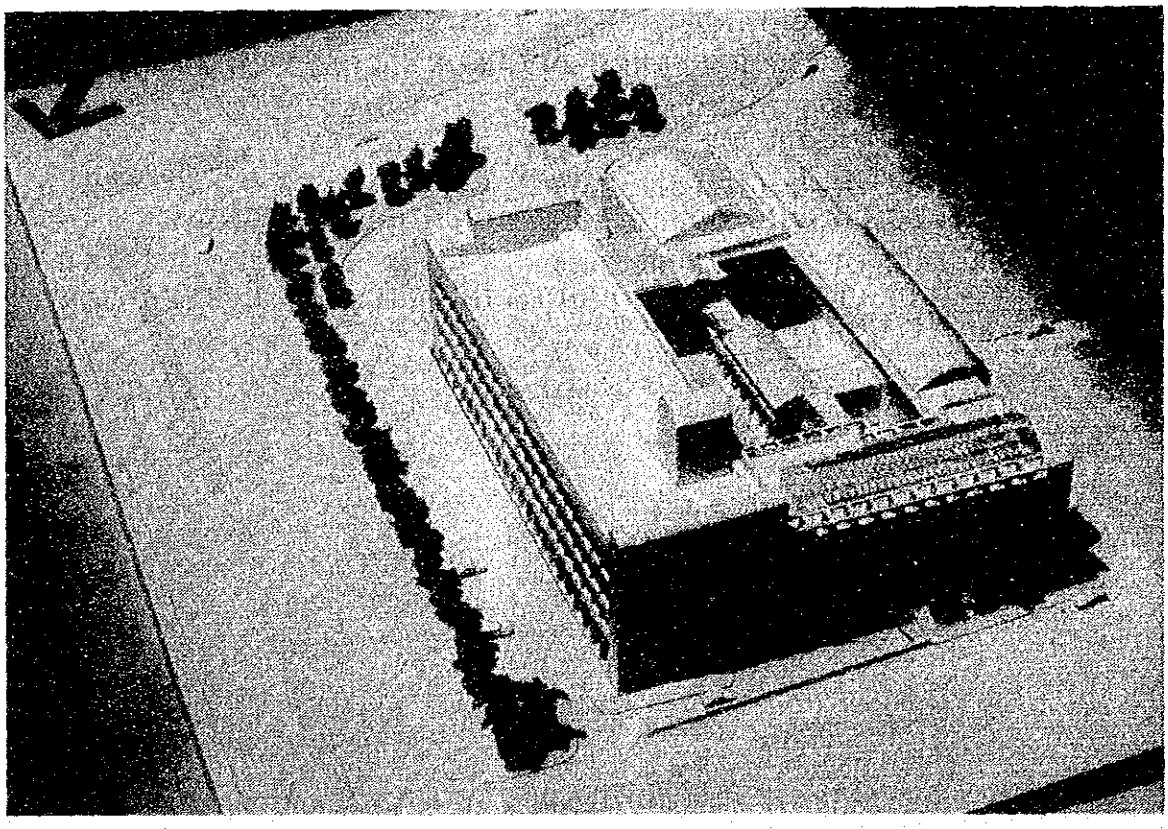
4-5 Basic Design Drawings

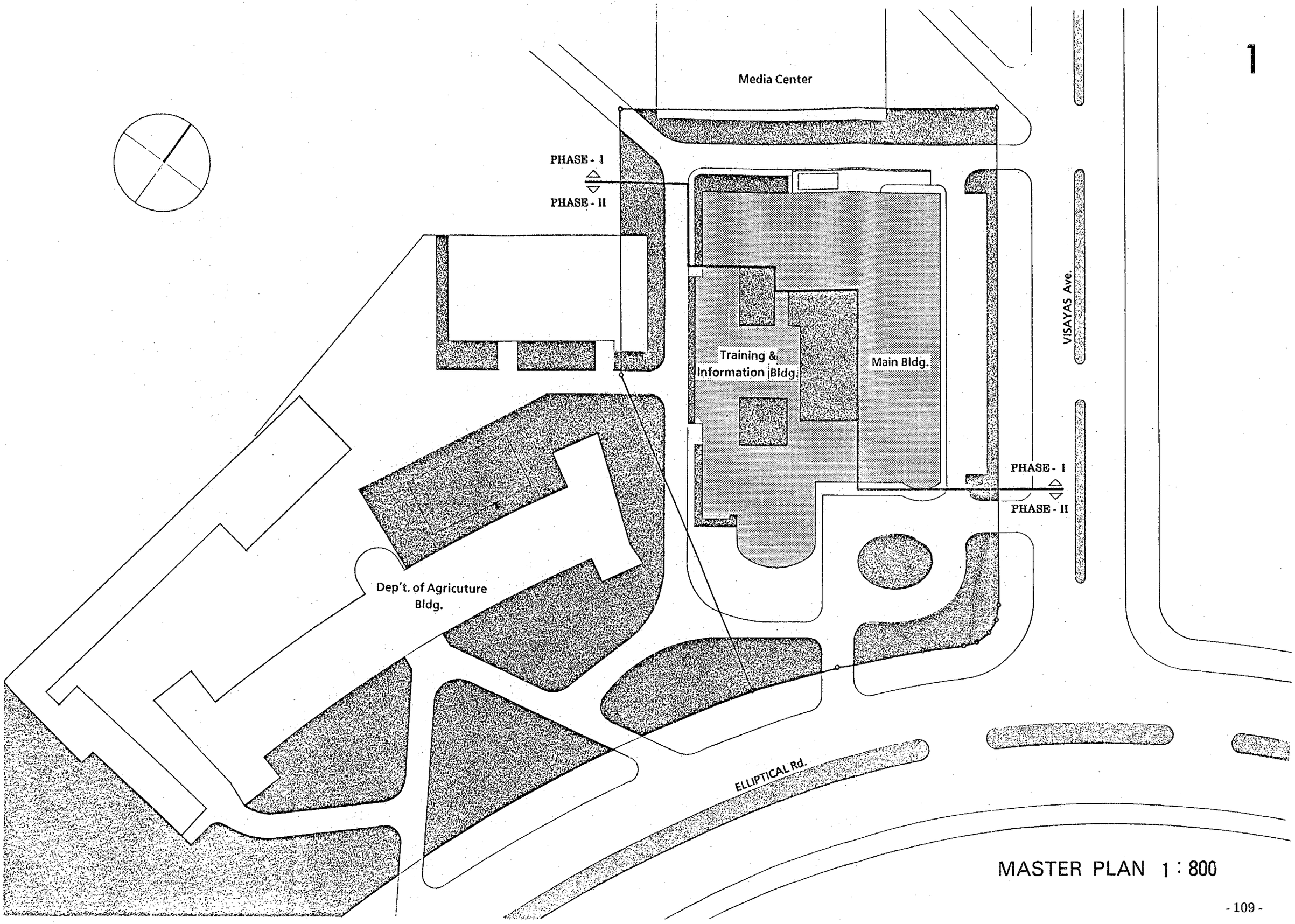
1. MASTER PLAN
2. BLOCK PLAN
3. GROUND FLOOR PLAN
4. 1st FLOOR PLAN
5. 2nd FLOOR PLAN
6. 3rd FLOOR PLAN
7. 4th FLOOR PLAN
8. ROOF FLOOR PLAN
9. SOUTH SIDE ELEVATION & SECTION
10. EAST AND NORTH SIDE ELEVATION
11. WEST SIDE ELEVATION & SECTION
12. SECTION
13. WATER SUPPLY, DRAINAGE, ELECTRICITY POWER SUPPLY AND TELEPHONE LINE SYSTEMS
14. LAYOUT OF EQUIPMENT No.1 (LABORATORY SERVICES DIV. 3rd FLOOR, SAMPLE RECEPTION ROOM GROUND FLOOR)
15. LAYOUT OF EQUIPMENT No.2 (LABORATORY SERVICES DIV. 3rd FLOOR)
16. LAYOUT OF EQUIPMENT No.3 (SOIL & WATER RESEARCH DIV. 3rd FLOOR)
17. LAYOUT OF EQUIPMENT No.4 (SOIL & WATER RESEARCH DIV. 4th FLOOR)
18. LAYOUT OF EQUIPMENT No.5 (CARTOGRAPHIC OPERATIONS DIV. GROUND FLOOR)
19. LAYOUT OF EQUIPMENT No.6 (INTEGRATED SOIL RESOURCES INFORMATION SYSTEM (ISRIS) 2nd FLOOR)

South Side Aerial View

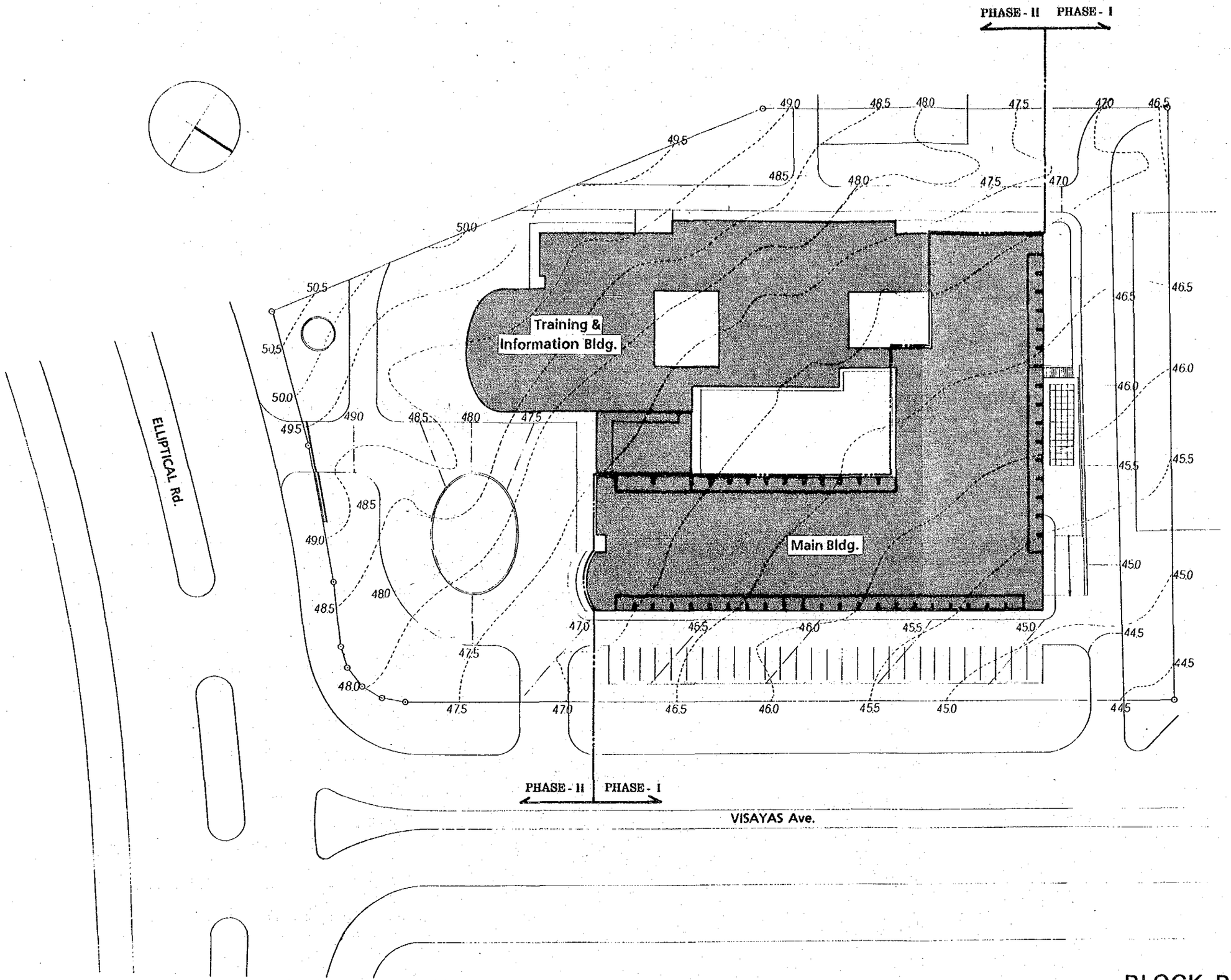


North Side Aerial View

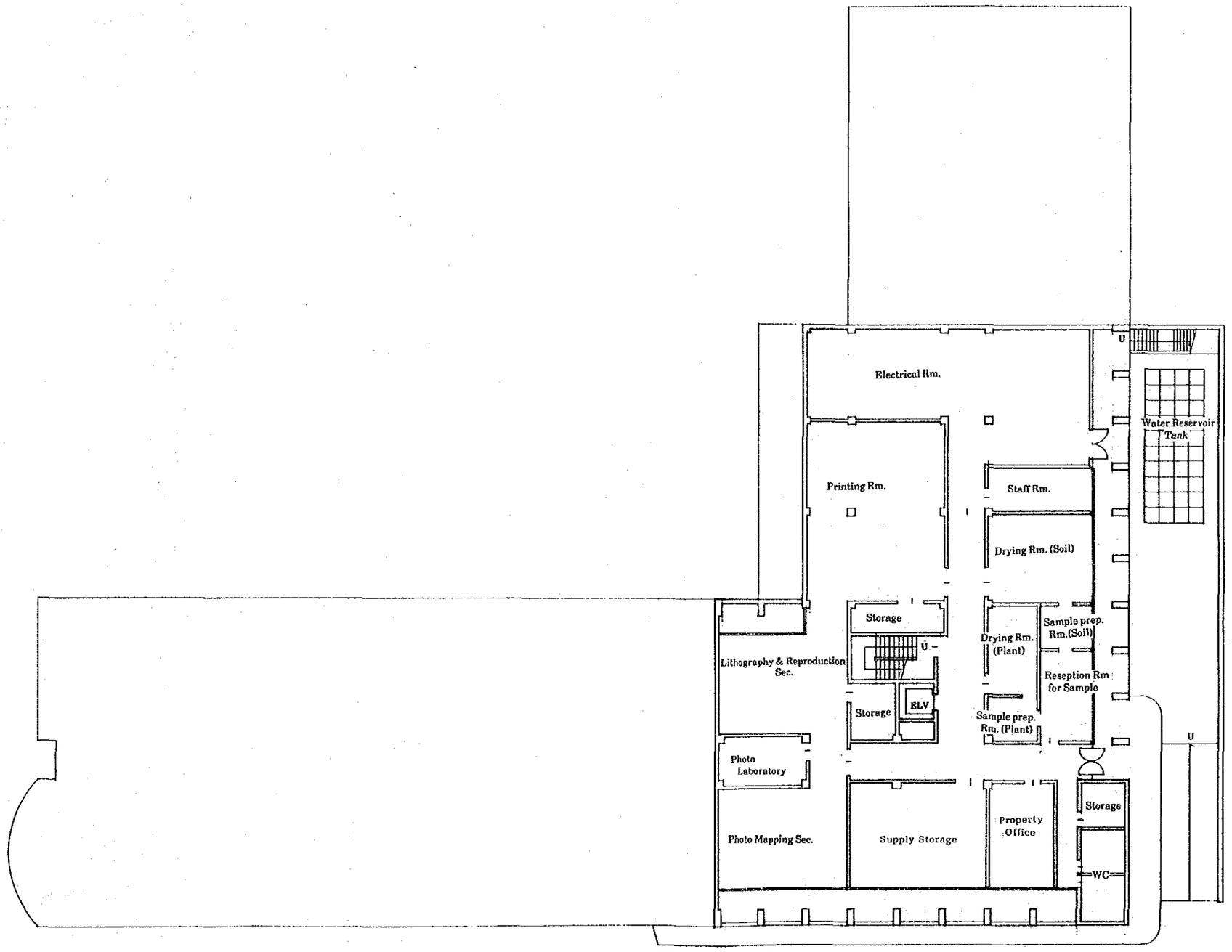




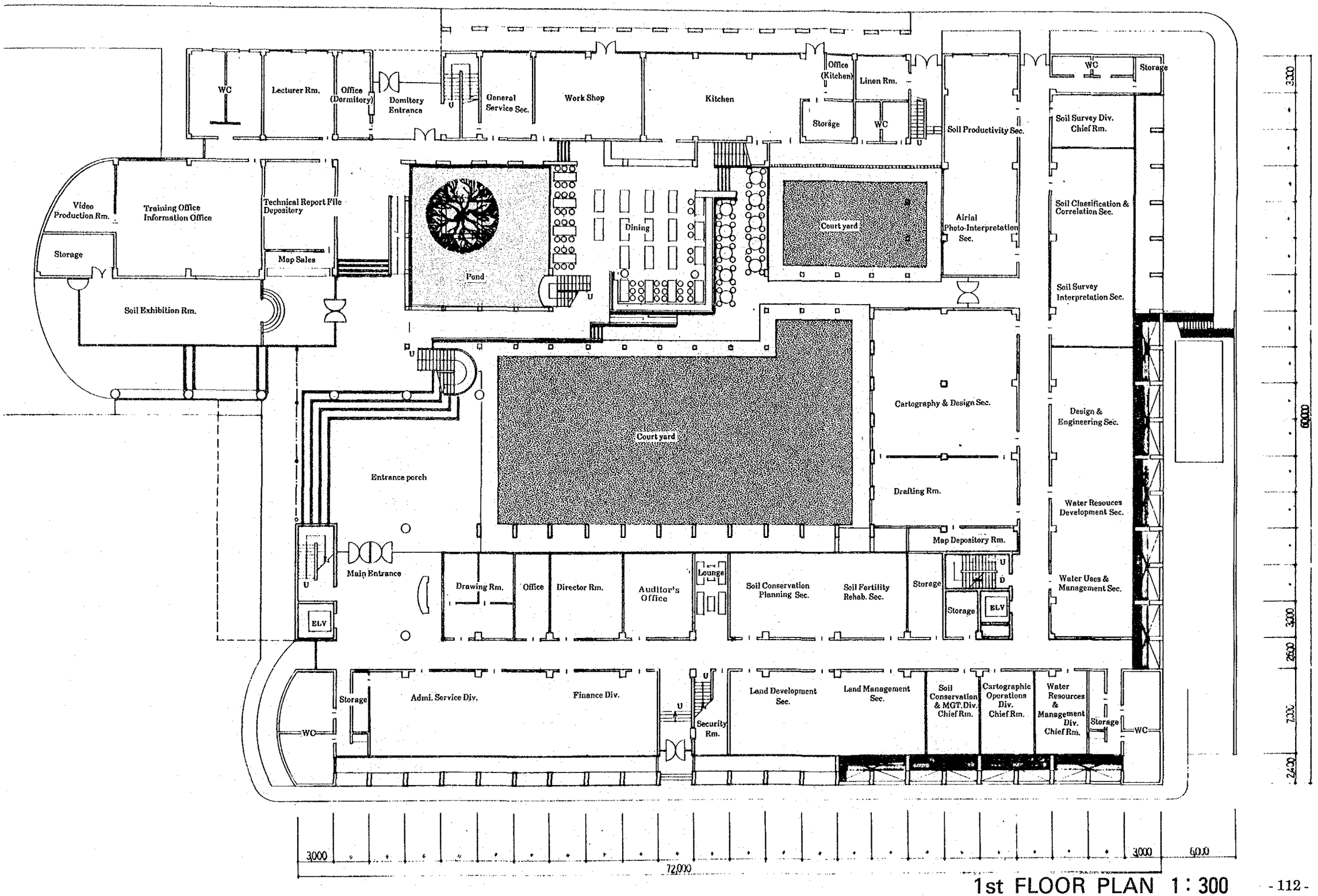
MASTER PLAN 1 : 800



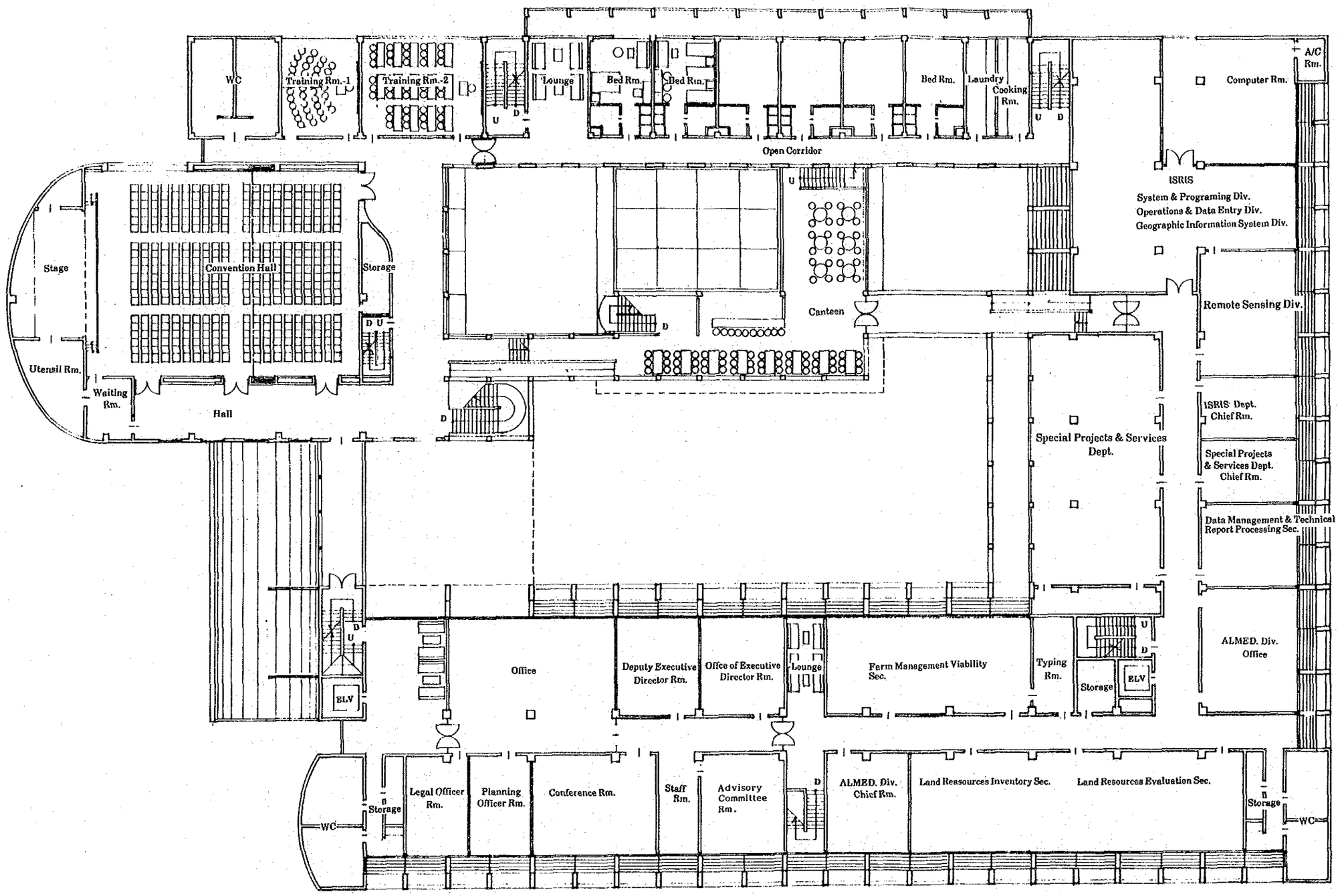
BLOCK PLAN 1: 600



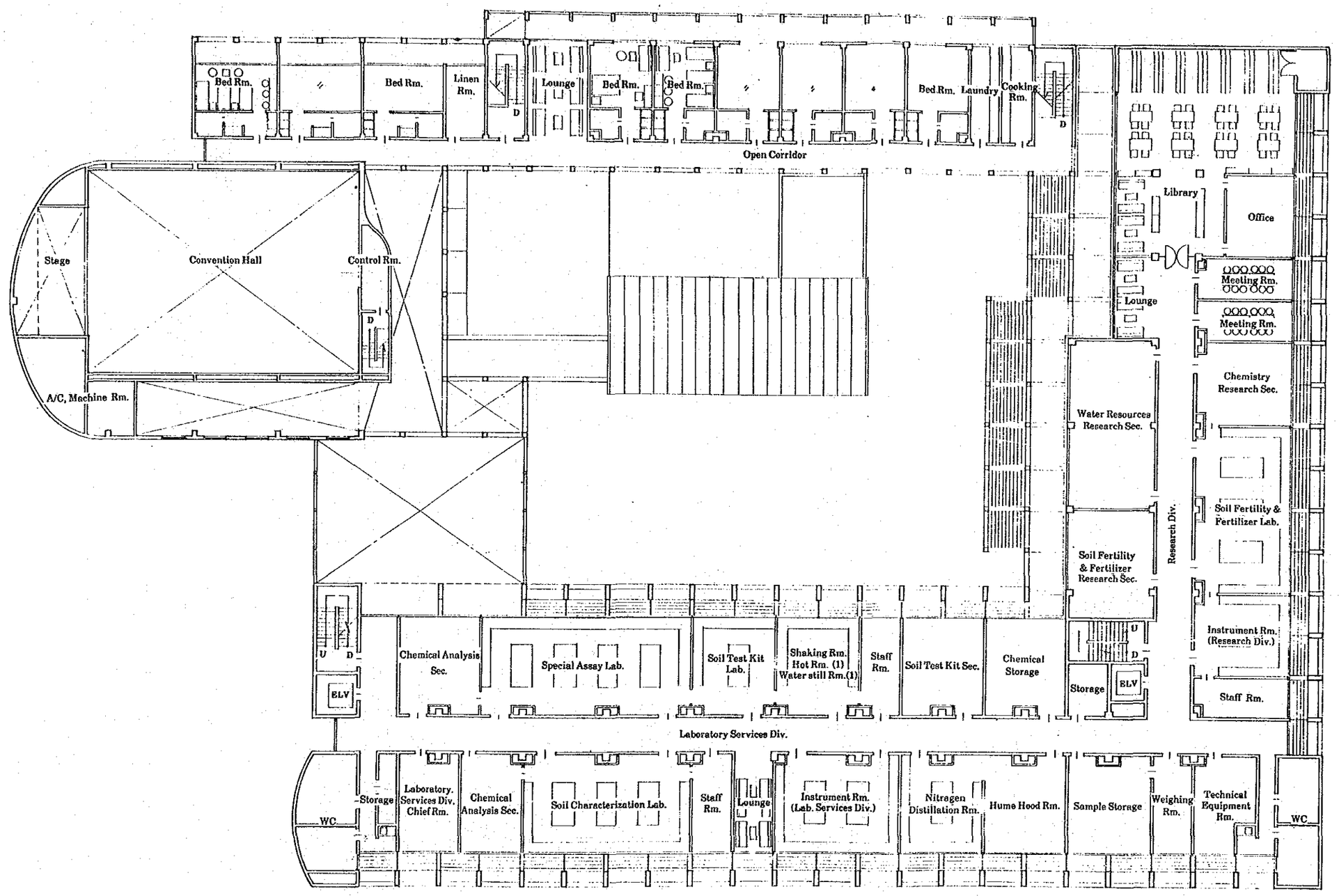
GROUND FLOOR PLAN 1 : 300



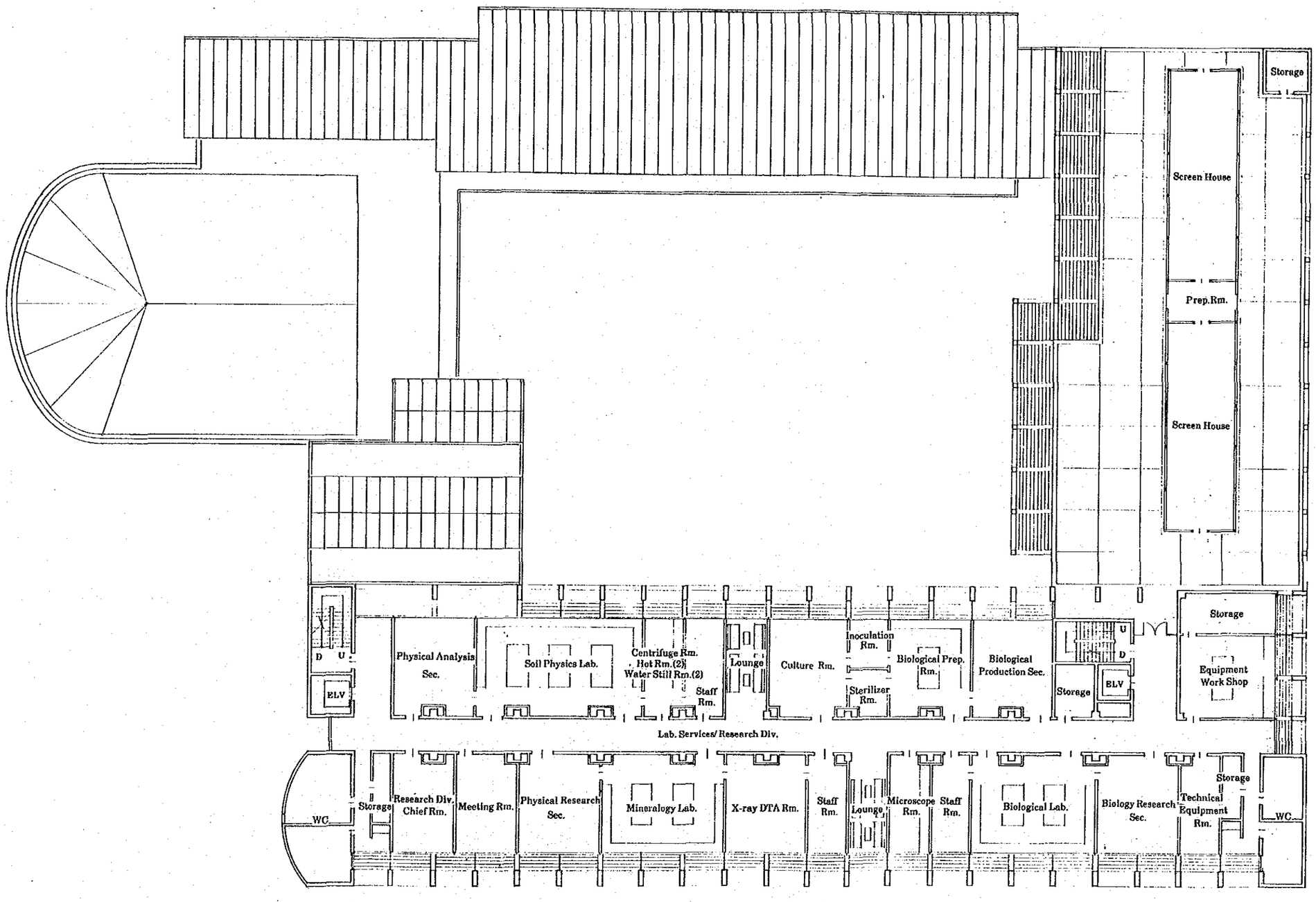
1st FLOOR PLAN 1 : 300



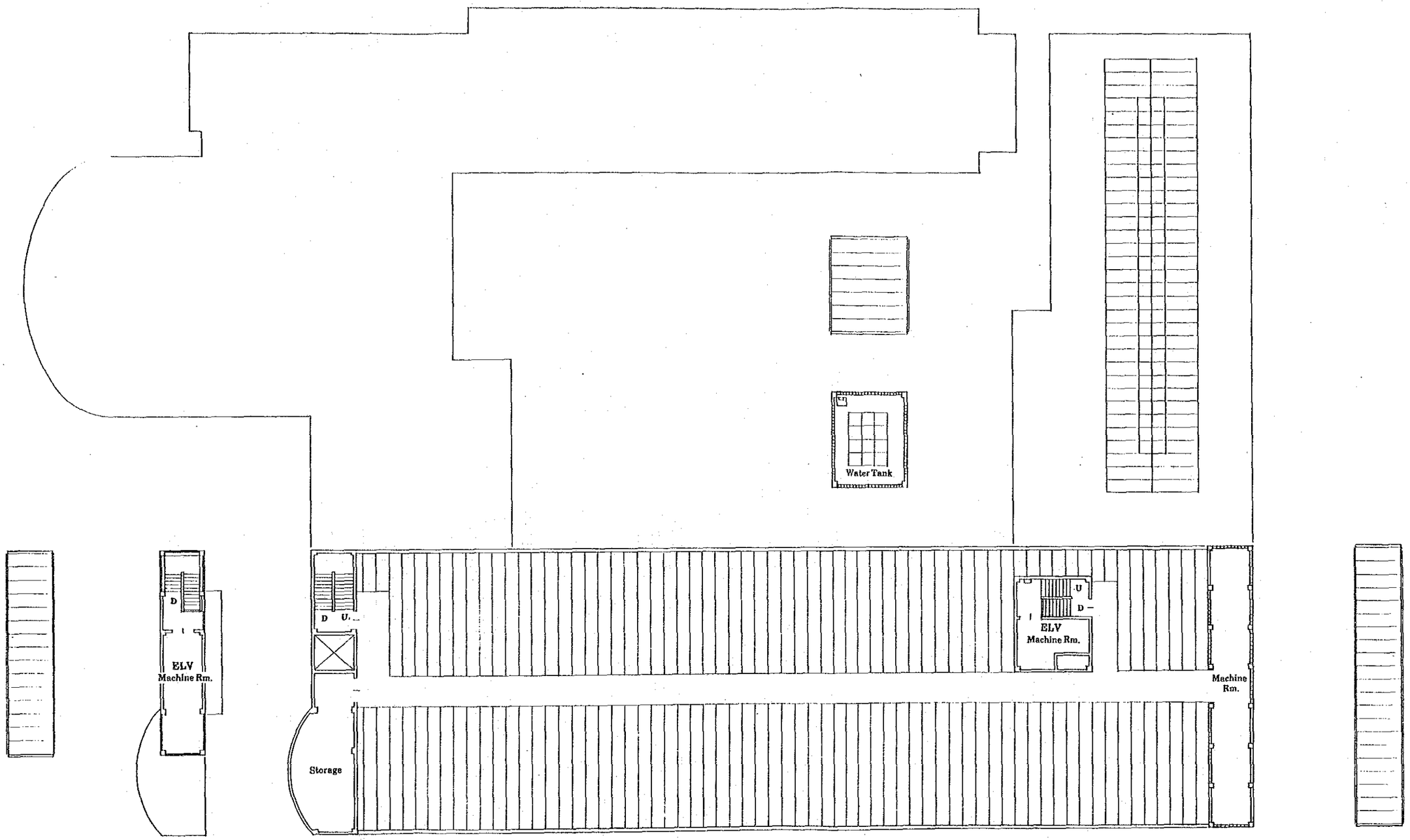
2nd FLOOR PLAN 1 : 300



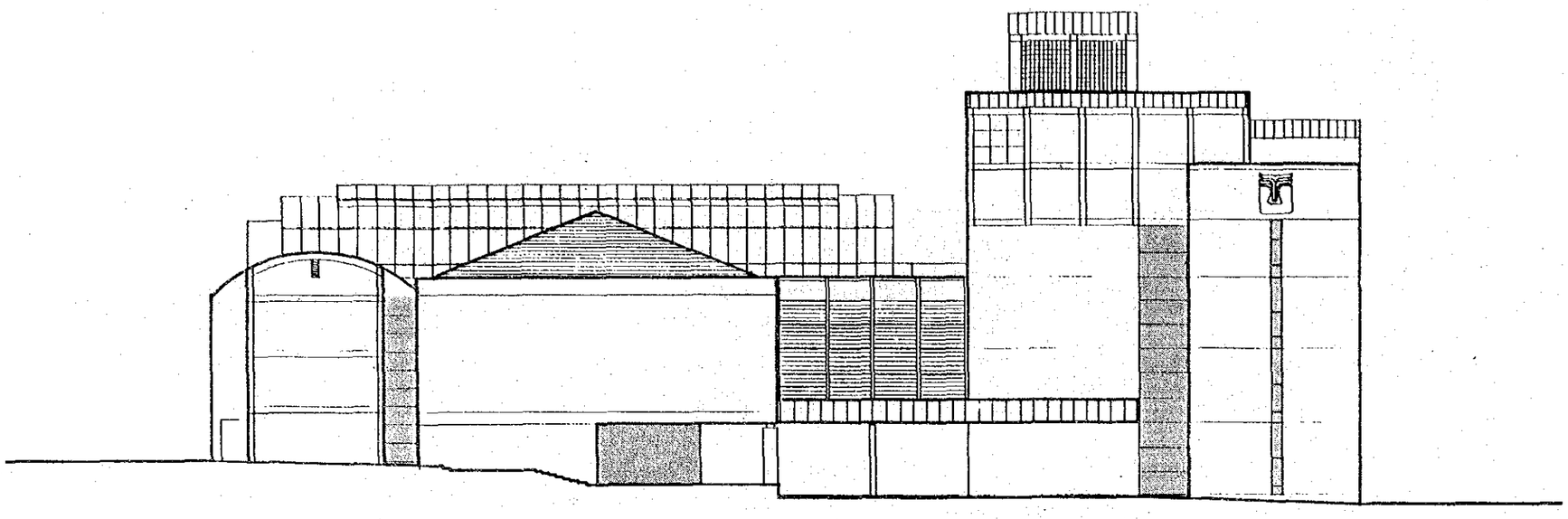
3rd FLOOR PLAN 1 : 300



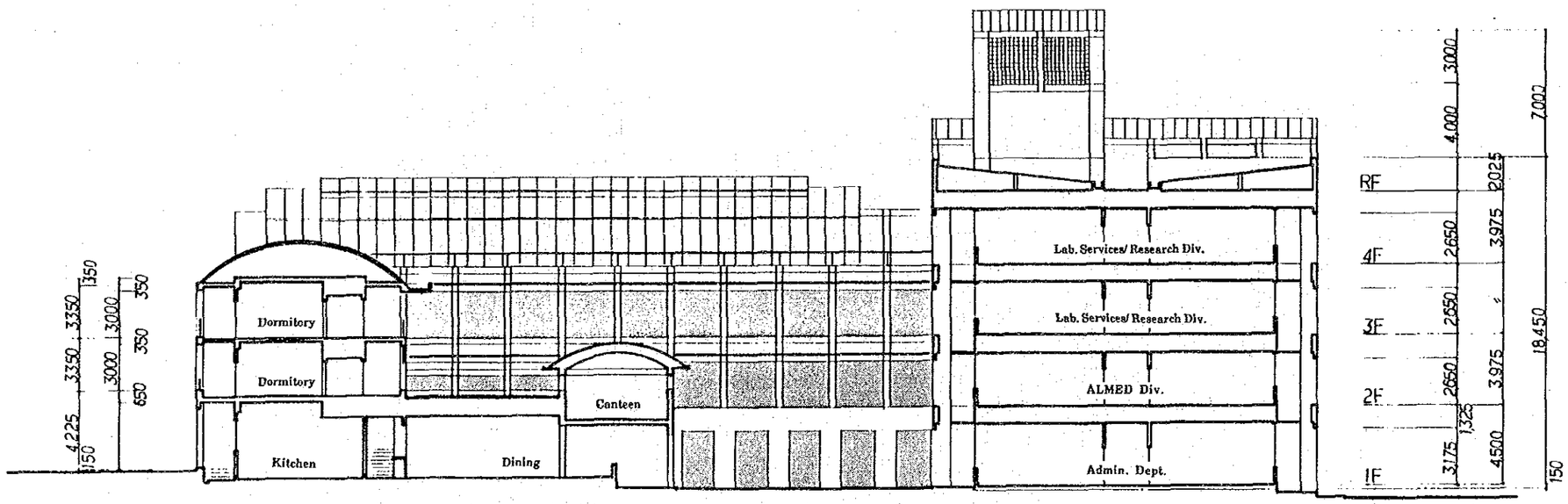
4th FLOOR PLAN 1 : 300



ROOF FLOOR PLAN 1 : 300

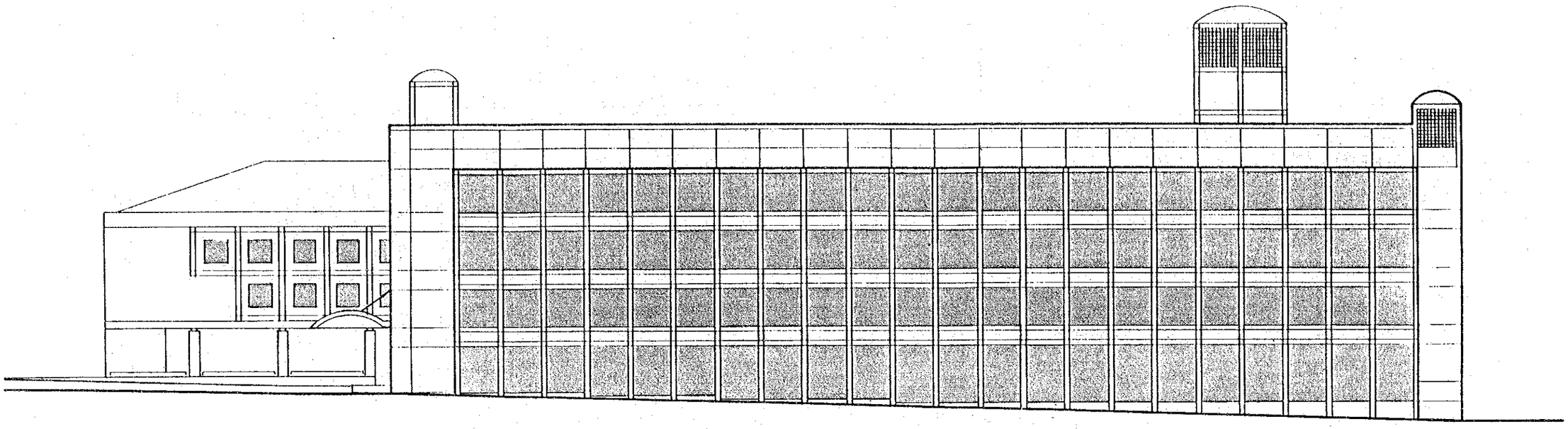


South Side Elevation

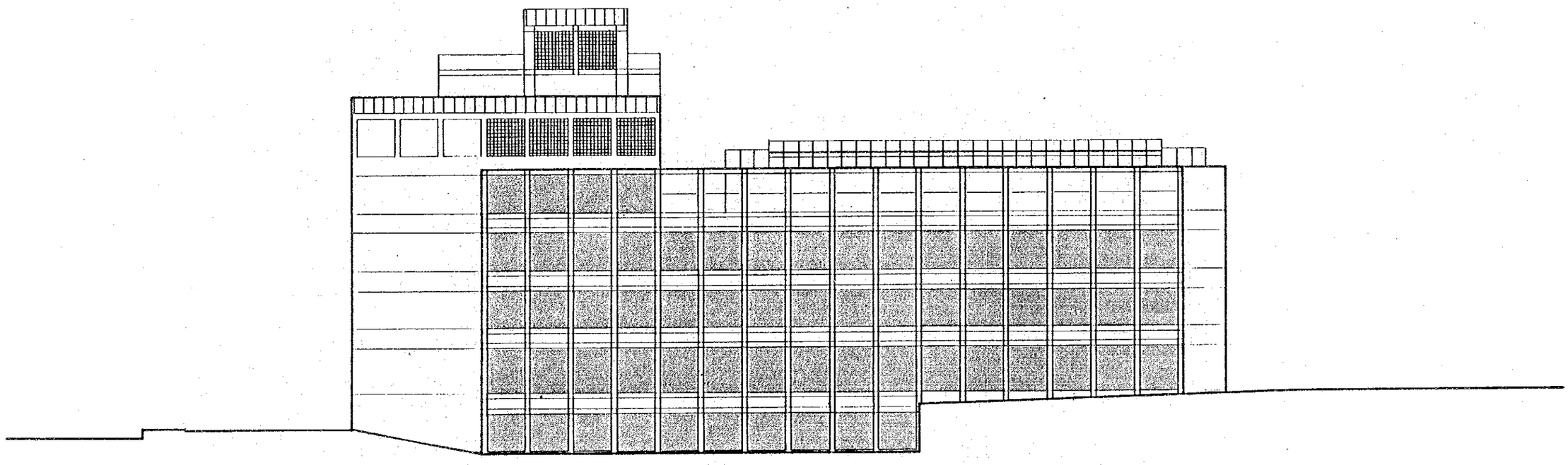


Section -1

SOUTH SIDE ELEVATION & SECTION 1 : 300

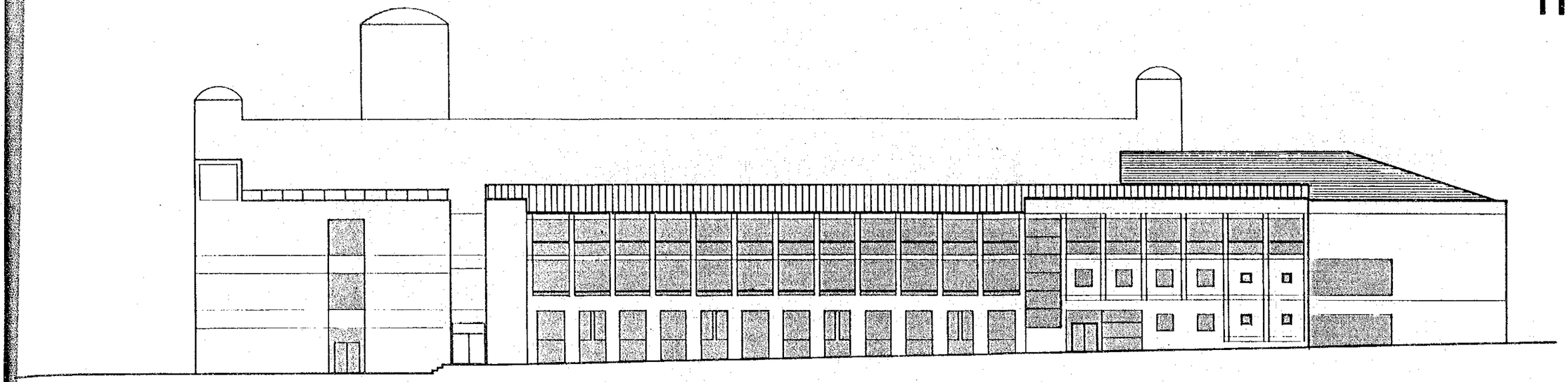


East Side Elevation

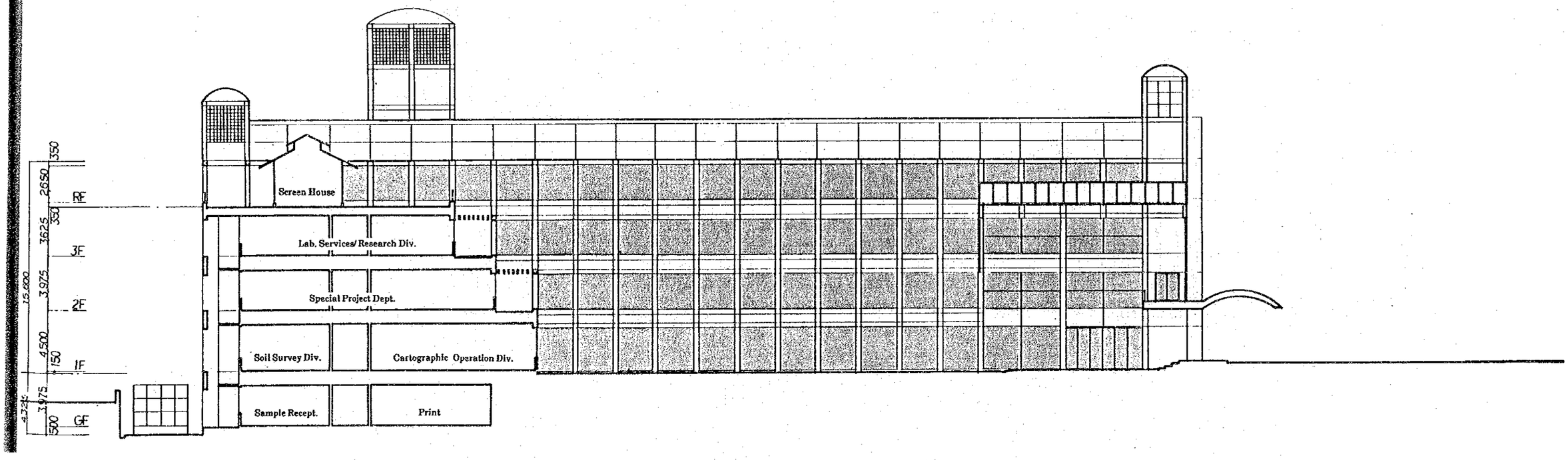


North Side Elevation

EAST AND NORTH SIDE ELEVATION 1 : 300

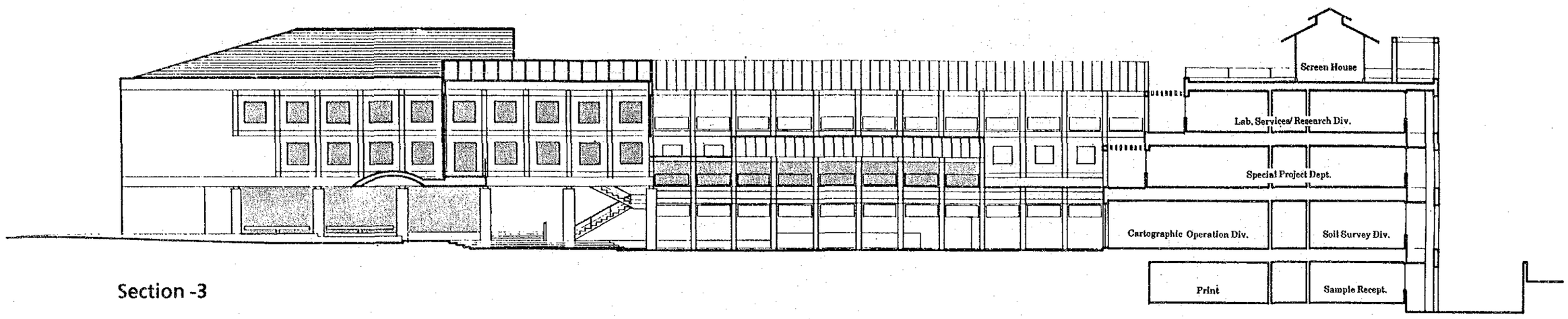


West Side Elevation

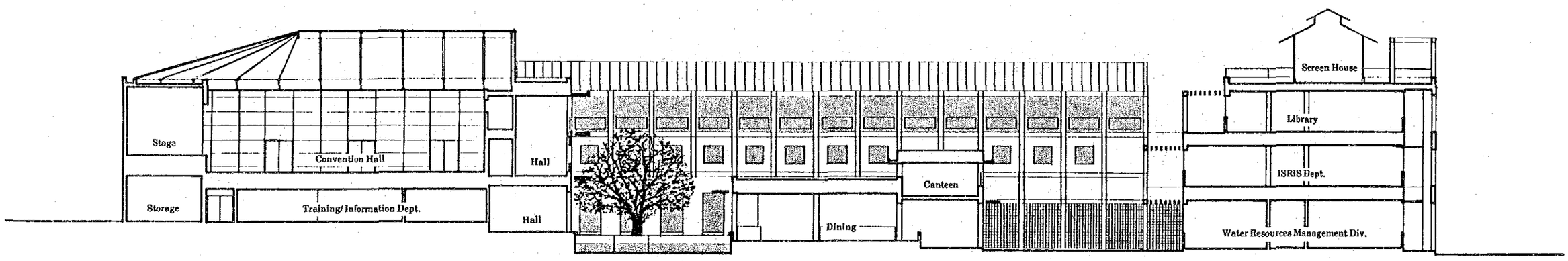


Section -2

WEST SIDE ELEVATION & SECTION 1 : 300

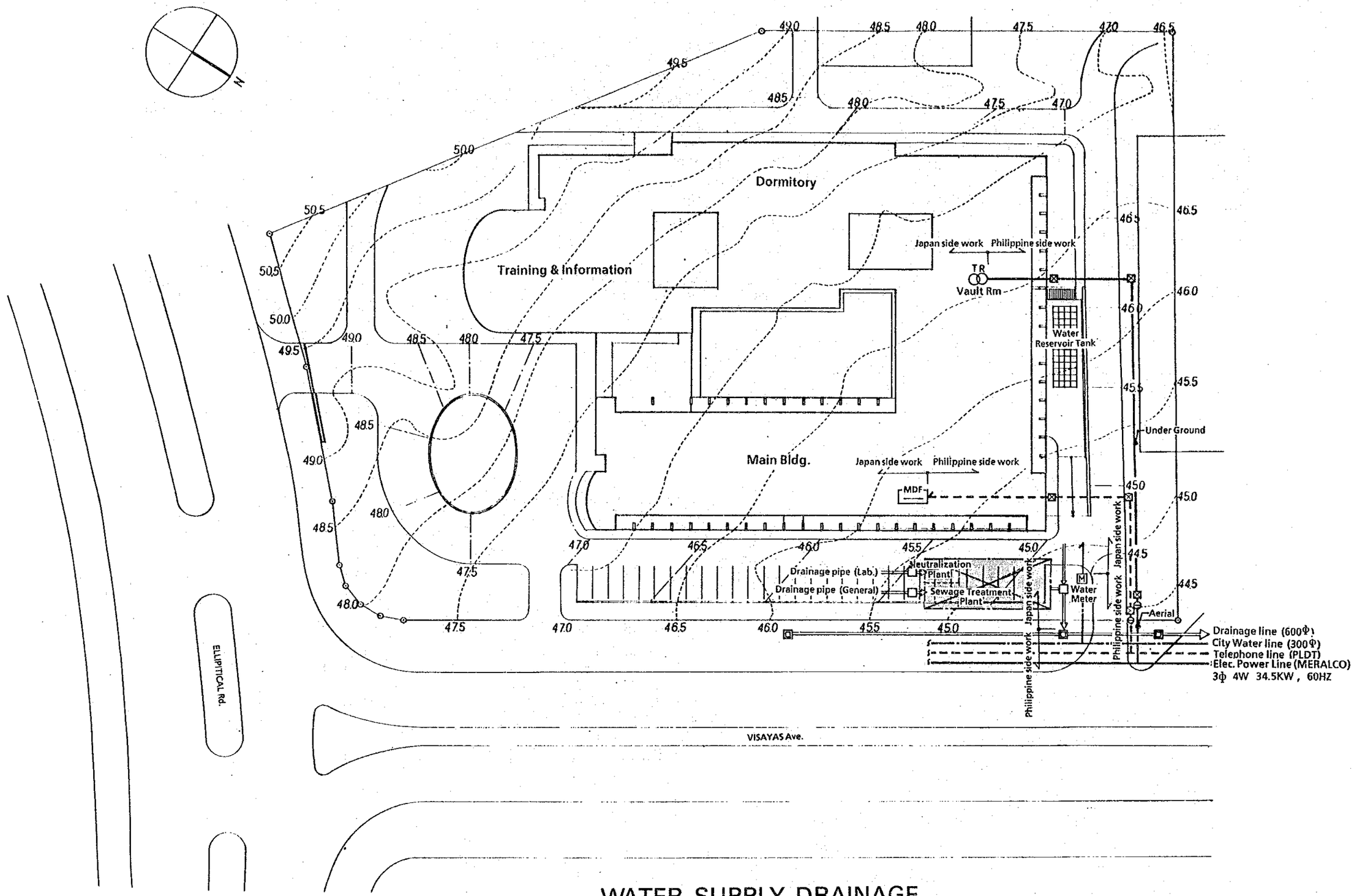


Section -3

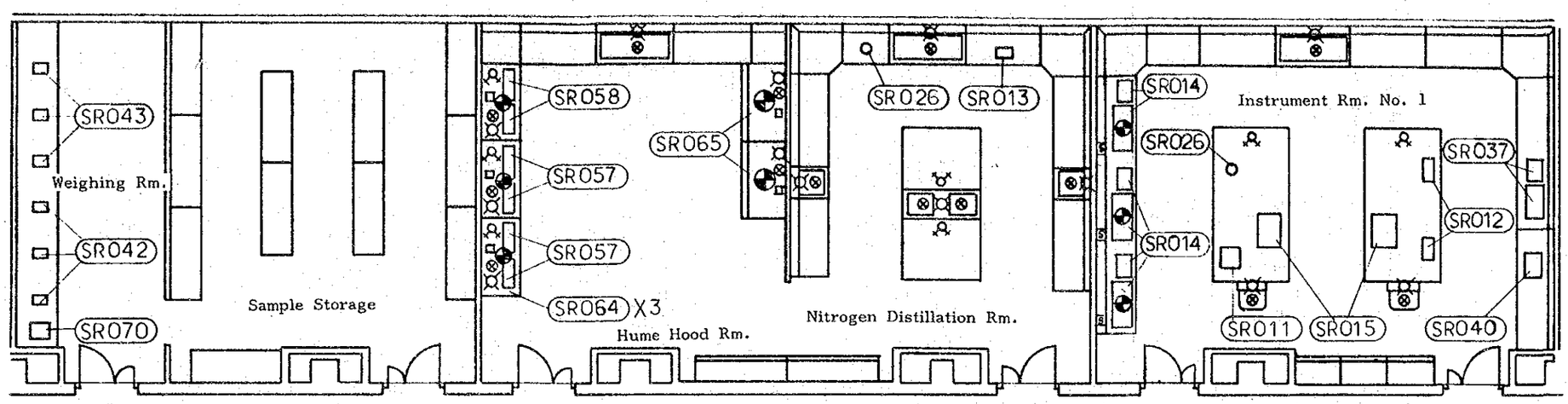


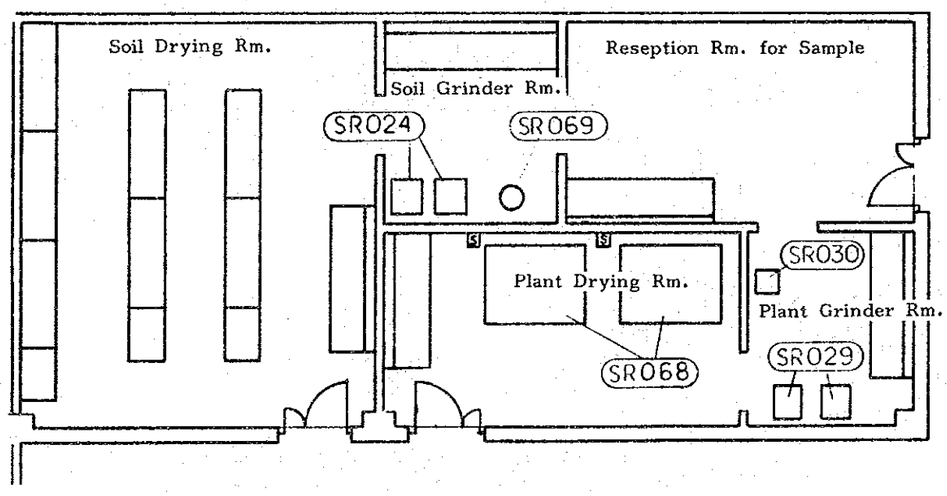
Section -4

SECTION 1 : 300



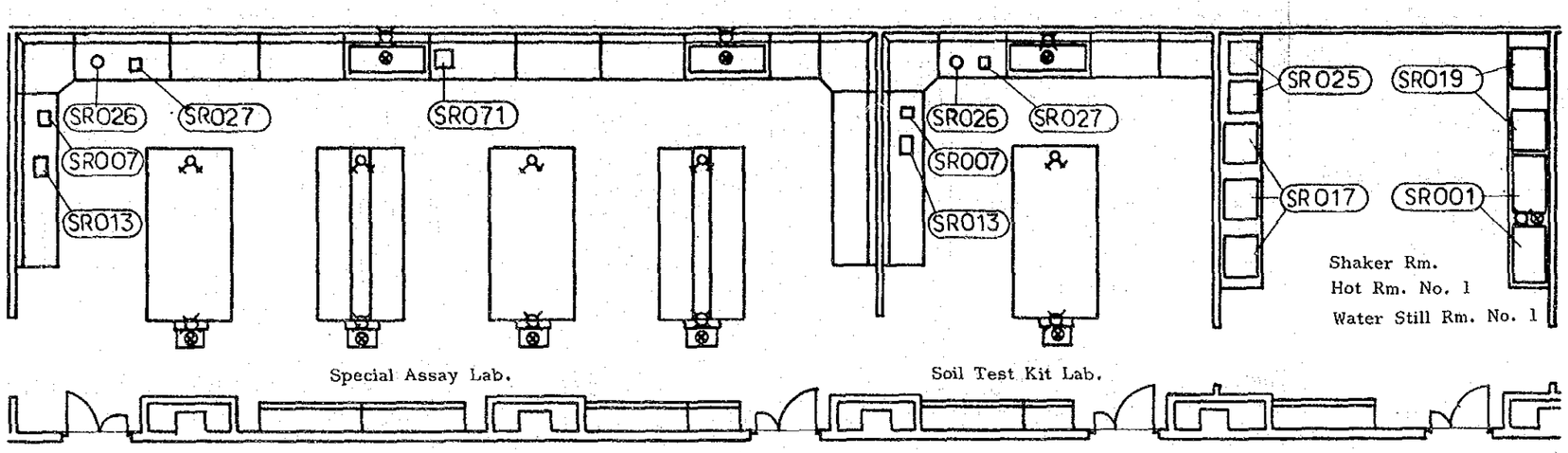
WATER SUPPLY, DRAINAGE
ELECTRICITY POWER SUPPLY AND TELEPHONE LINE SYSTEMS

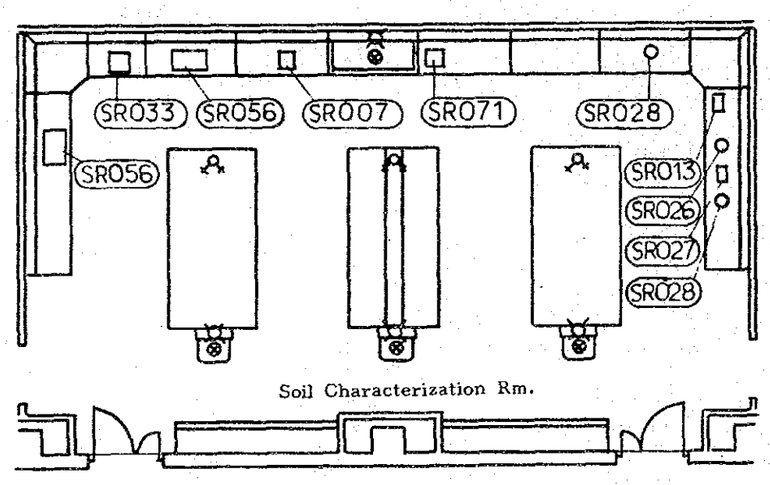




Room Name	Item No.	Equipment	Q'ty
Instrument Rm. No. 1	SR-011	Electric Conductivity Meter	1
	012	pH Meter	2
	014	Atomic Absorption Flame Spectro-Photometer	3
	015	Spectro-Photometer	2
	026	Magnetic Stirrer	1
	037	Liquid Chromatograph	1
	040	Organic Carbon Analyzer	1
Nitrogen Distillation Rm.	SR-013	Auto-Titrater	1
	026	Magnetic Stirrer	1
Hume Hood Rm.	SR-020	Hot Plate	2
	057	Semi-Micro-Kjeldahl Digester	4
	058	Macro-Kjeldahl Digester	2
	064	Fume Hood, Regular	3
	065	Fume Hood, Perchloric	2
Weighing Rm.	SR-042	Electronic-Top Laoding Balance	3
	043	Electronic-Analytical Balance	3
	070	Platform Balacne	1
Plant Grinder Rm.	SR-029	Plant Grinder, Big Type	2
	030	Plant Grinder, Small Type	1
Plant Drying Rm.	SR-068	Plant Dryer	2
Soil Grinder Rm.	SR-024	Jaw Crusher	2
	069	Vibration Sieving Machine	1

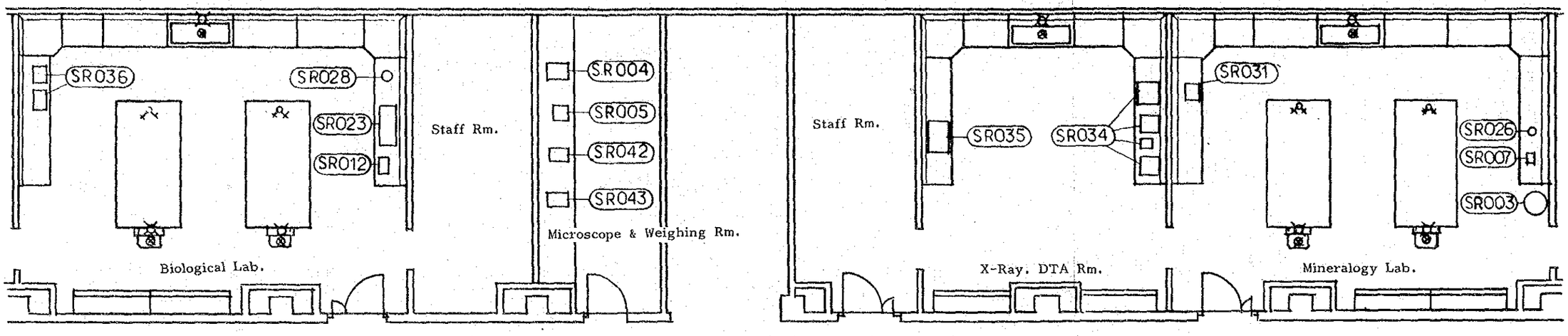
LAYOUT OF EQUIPMENT No.1 (LABORATORY SERVICES DIV, 3rd FLOOR SAMPLE RECEPTION ROOM GROUND FLOOR)

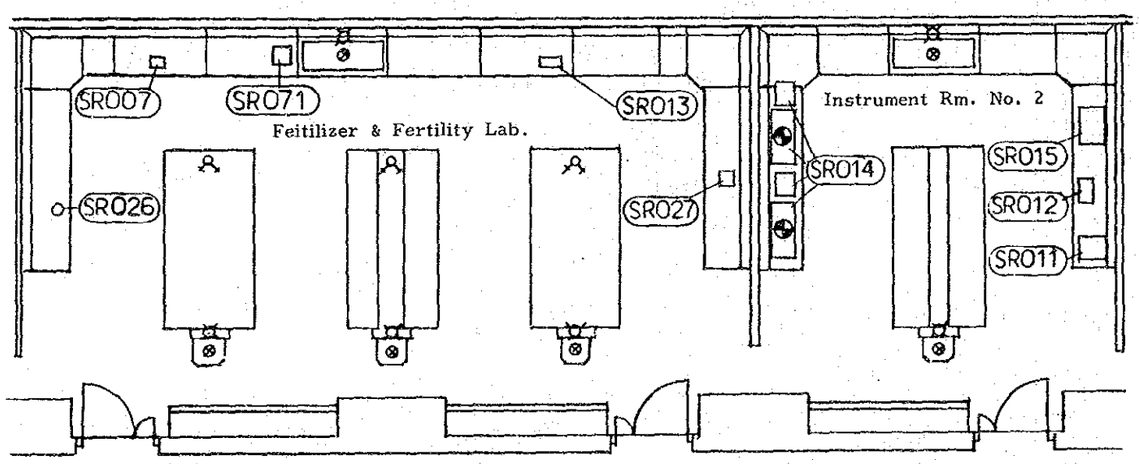




Room Name	Item No.	Equipment	Q'ty
Special Assay Lab.	SR-007	Auto-Diluter	1
	013	Auto-Titrater	1
	026	Magnetic Stirrer	1
	027	Magnetic Stirrer w/Hot Plate	1
	071	Pipette Washer	1
Soil Test Kit Lab.	SR-007	Auto-Diluter	1
	013	Auto-Titrater	1
	026	Magnetic Stirrer	1
	027	Magnetic Stirrer w/Hot Plate	1
Shaker Rm.	SR-025	Multi Shaker	2
Water Still Rm. No. 1	SR-001	Water Still	2
Hot Rm. No. 1	SR-017	Temperature Control Oven	3
	019	Muffle Furnace	2
Soil Characterization Rm.	SR-007	Auto-Diluter	1
	013	Auto-Titrater	1
	026	Magnetic Stirrer	1
	027	Magnetic Stirrer w/Hot Plate	1
	028	Test-Tube Mixture	1
	033	Vacuum Pump	1
	056	Soil Exchange Capacity Analyzer	2
	071	Pipette Washer	1

LAYOUT OF EQUIPMENT No.2
(LABORATORY SERVICES DIV. 3rd FLOOR)

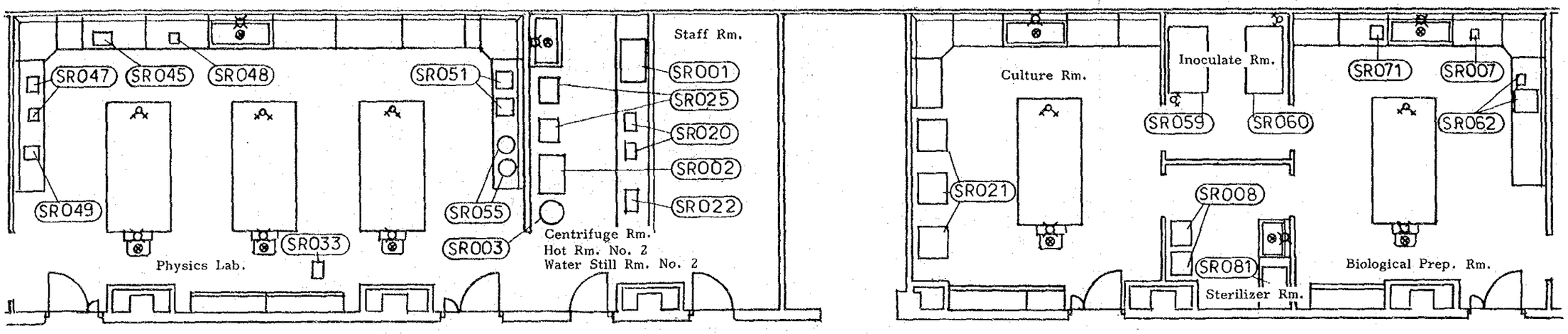




Room Name	Item No.	Equipment	Q'ty
Instrument Rm. No. 2	SR-011	Electric Conductivity Meter	1
	012	pH Meter	1
	014	Atomic Absoption Flame Sepctro-Photometer	2
	015	Spectro-Photometer	1

Room Name	Item No.	Equipment	Q'ty
Feitilizer & Fertility Lab.	SR-007	Auto-Diluter	1
	013	Auto-Titrater	1
	026	Magnetic Stirrer	1
	027	Magnetic Stirrer w/Hot Plate	1
	071	Pipette Washer	1
Mineralogy Lab.	SR-003	Centrifuge	1
	007	Auto-Diluter	1
	026	Magnetic Stirrer	1
	031	Mechanical Stirrer	1
X-Ray. DTA Rm.	SR-034	DTA-TGA Analyzer	1
	035	X-Ray Diffraction	1
Microscope & Weighing Rm.	SR-004	Biological Microscope	1
	005	Polatizing Microscope	1
	042	Electro-Top Loading Balance	1
	043	Electro-Analytical Balance	1
Biological Lab.	SR-012	pH Meter	1
	023	Shaking Bath	1
	028	Test-Tube Mixer	1
	036	Gas Chromatograph	1

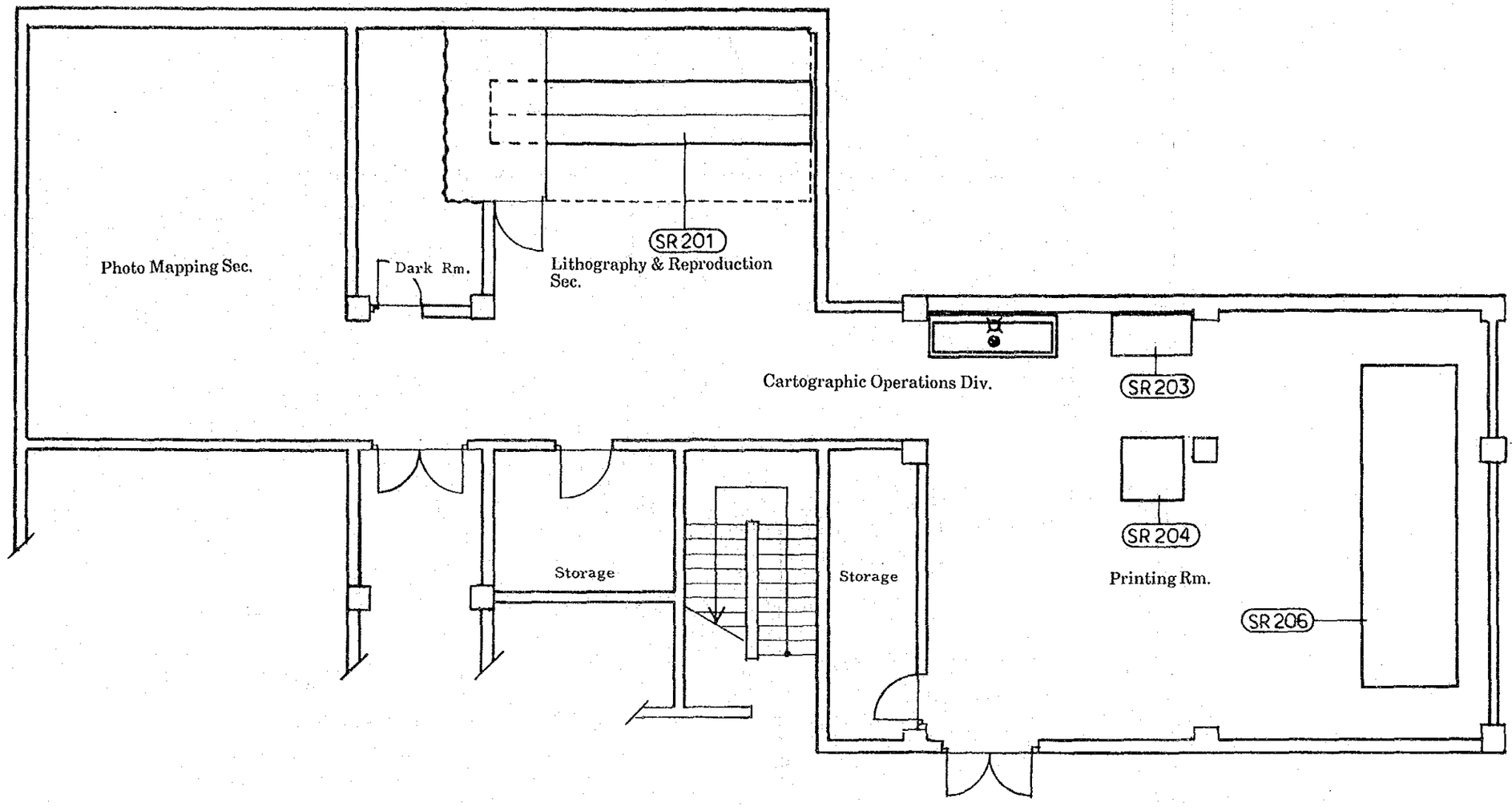
LAYOUT OF EQUIPMENT No.3
(SOIL & WATER RESEACH DIV. 3rd FLOOR)



Room Name	Item No.	Equipment	Q'ty
Physics Lab.	SR-033	Vacuum Pump	1
	045	Actual Volume Meter	1
	047	Pipette Analyzer	2
	048	Volume Weight Tester	1
	049	Liquid Limit Device	1
	051	Moisture Retention Meter	2
	055	Sand Piller Kit	2
Centrifuge Rm.	SR-002	High Speed Centrifuge w/Refrigerator	1
	003	Centrifuge	1
	025	Shaker	2
Water Still Rm. No. 2	SR-001	Water Still	1
Hot Rm. No. 2	SR-020	Hot Plate	2
	022	Water Bath	1

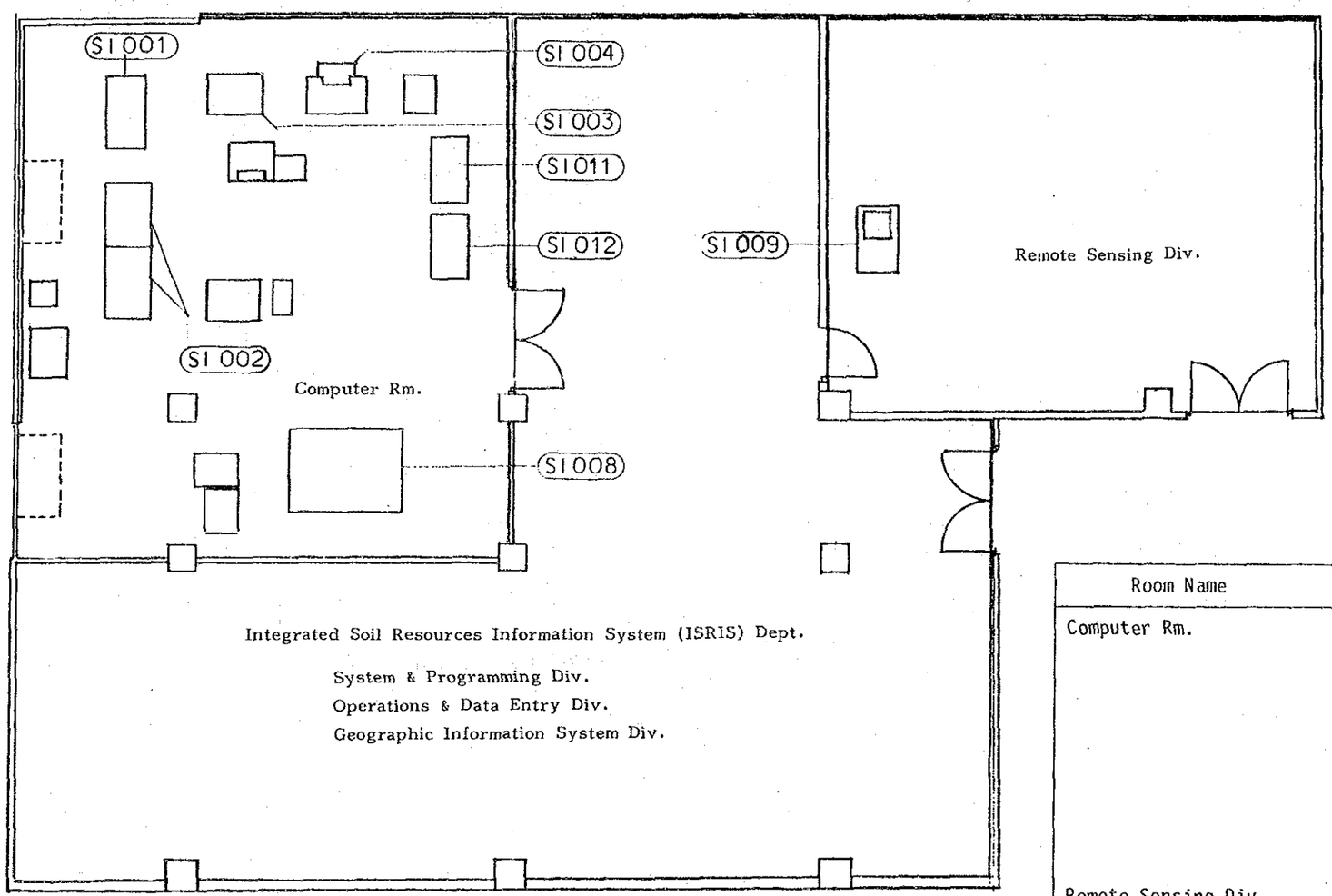
Room Name	Item No.	Equipment	Q'ty
Inoculate Rm.	SR-059	Clean Bench, Vertical Type	1
	060	Clean Bench, Horizontal Type	1
Sterilizer Rm.	SR-008	Autoclave	2
	081	Dry Air Sterilizer	1
Biological Prep. Rm.	SR-007	Auto-Diluter	1
	062	Jar Fermenter Continuous Control System	1
	071	Pipette Washer	1
Culture Rm.	SR-021	Incubator	3

LAYOUT OF EQUIPMENT No.4
(SOIL & WATER RESEARCH DIV. 4th FLOOR)



Room Name	Item No.	Equipment	Q'ty
Cartography	SR-201	Process Camera	1
	203	Whirler	1
	204	Printing Frame	1
	206	Offset Proof Press (2 colors)	1
	207	Supporting Materials for Printing Eqiupment	1L.S.

LAYOUT OF EQUIPMENT No.5
(CARTOGRAPHIC OPERATIONS DIV. GROUND FLOOR)



Room Name	Item No.	Eqiupment	Q'ty
Computer Rm.	SI-001	Main CPU	1 L.S.
	002	Magnetic Disk Unit	1 L.S.
	003	Magnetic Tape Unit	1 L.S.
	004	Line Printer	1
	005	Terminal Display	10
	006	Personal Cumputer	2
	007	Serial Printer	2
	008	XY Plotter	1
Remote Sensing Div.	SI-009	Graphic Display	1
	010	Hard Copy	1
	011	Drum Scanner	1
	012	Photo Printer	1

LAYOUT OF EQUIPMENT No.6 (INTEGRATED SOIL RESOURCES INFORMATION SYSTEM (ISRIS) 2nd FLOOR)

CHAPTER 5. PROJECT IMPLEMENTATION PLAN

CHAPTER 5 PROJECT IMPLEMENTATION PLAN

5-1 Project Implementation System

It is desirable that the Project be implemented under the following system provided that it is subject to the grant aid cooperation of the Government of Japan.

(1) Project Implementation Body

The organization responsible for the planning and implementation of the Project on the Philippine Government side is the Bureau of Soils and Water Management of the Department of Agriculture. In February, 1988, the Department of Agriculture established the Project Steering Committee and the Project Management Office (responsible for project implementation), pursuant to an Executive Order (see Figure 5-1-1).

The BSWM will supervise the actual implementation of the Project by the Project Management Office, pursuant to the policy formulated by the Project Steering Committee.

The Project Steering Committee is composed of the Chairman (Secretary for Agriculture), Vice-Chairman (Assistant Secretary for Bureau Operations) and three members (Director of the BSWM, Assistant Secretary for Finance and the NEDA representative) and is responsible for the preparation of project policies and the approval of important matters.

The Project Management Office is composed of the Executive Director (Director of the BSWM), 16 staff members of the Bureau and ten representatives of the consultant group and will be responsible for the actual implementation of the work associated with the Project. The PMO will also conduct negotiations concerning the Project with other related organizations.

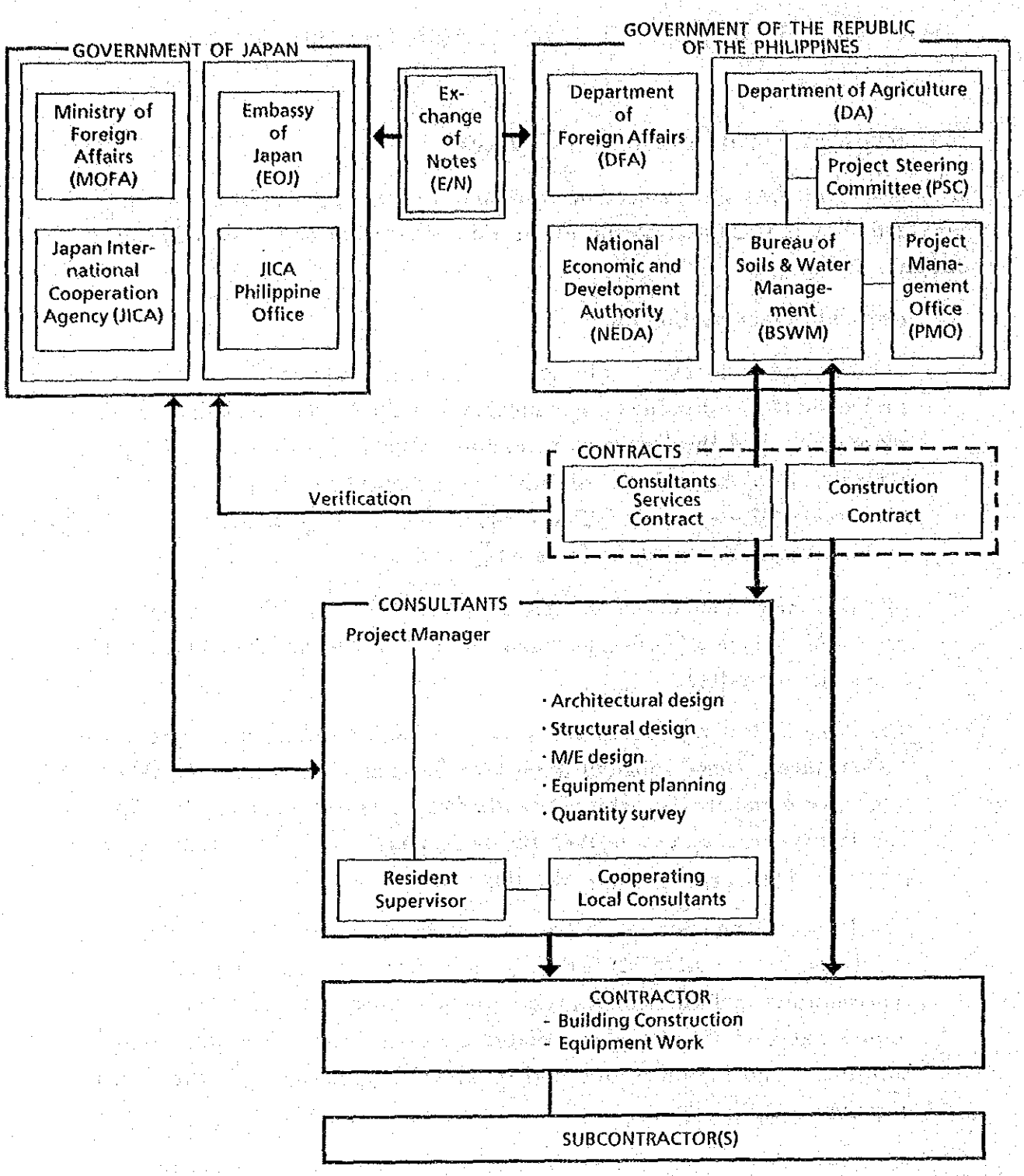


Fig. 5-1-1. Executing Organizational Chart

(2) Consultant

A Japanese consultant will enter into a consultancy agreement with the Government of the Philippines to conduct the detailed design for the buildings and equipment for the Center and to supervise the construction work so that the grant aid cooperation for the Project in terms of building construction and the provision of equipment is smoothly carried out. The consultant will also prepare the tender documents and conduct the tender procedure on behalf of the project implementation body.
Philippine Government representative will be present during the tendering procedures in accordance with the Government Policty on the implementation of foreignassisted project.

(3) Contractors

A Japanese contractor for the building construction and a Japanese contractor for the equipment provision will be selected through open tender, pursuant to the grant aid cooperation procedure of the Government of Japan,. and they will carry out their respective assignments.

5-2 Division of Work

5-2-1 Work to be Undertaken by Japanese Side

(1) Buildings

- Main Building . . . including soil survey, research, experiment, information processing and general administration facilities
- Training and Information Building . . . including research and public relations facilities, convention room and dormitories
- others . . . garage, guardhouse, etc.

(2) Equipment

- equipment for soil surveys, research and experiments
- equipment for regional stations
- equipment for integrated soil research and information system
- equipment for training and public relations
- others

(3) Service Work

- water supply system (on-site)
- power reception and transforming system
- telephone exchange system

(4) Outside Work

- on-site roads and carpark
- drainage system (on-site)
- primary treatment facility for waste water
- outdoor lamps

(5) Transportation

- transportation of equipment and materials from Japan to the Philippines
- transportation of equipment and materials from the port of arrival in the Philippines to the project site

5-2-2 Work to be Undertaken by Philippine Side

(1) Site Work and Outside Work

- necessary site for the Center
- land preparation
- fences and gates
- landscaping

(2) Service Work

- extension of power, water and telephone lines to the site
- provision of drainage system from site

(3) Equipment

- installation and adjustment of already owned equipment

(4) Furniture and Fixtures

- provision of furniture and fixtures outside the scope of the Japanese grant aid cooperation

(5) Conveniences and Cost Sharing

- bank clearance costs
- costs associated with tax exemption procedure
- measures to facilitate smooth customs clearance and land transportation in the Philippines
- exemption of Japanese personnel engaged in the Project, pursuant to the approved agreements, from import duties, domestic taxes and other levies of the Government of the Philippines
- provision of necessary conveniences in regard to the entry and residence of the above Japanese personnel in the Philippines
- provision of personnel required for the management of the Project based on a carefully considered staff plan

5-3 Construction Work and Supervision

5-3-1 Conditions of Construction Industry

The current conditions of the construction industry in metropolitan Manila are outlined below.

- Construction companies are very capable and skilled workers are available.
- Carpentry, plastering, steel framing and other construction fields are all specialized and the respective groups of workers are supervized by masters. Ordinary workers are not specialized and are often employed on a part-time basis. Compared to the standard in Japan, the required manpower level is three times higher on average.
- Components are usually fabricated or assembled on site rather than at the factory.
- The technical certification system for skilled workers is not as widely enforced as that in Japan. Similarly, product inspection and measuring equipment is not widely available.

5-3-2 Points to Note for Construction Work

As the subject structure is a reinforced concrete, four story building (five stories in part), local contractors possess sufficient skill to carry out the required construction work. However, either the dispatch of engineers or on-site instruction by skilled workers will be necessary for the following types of work, as engineers with a thorough knowledge of the special features, required precision and relevant specifications are not readily available in the Philippines.

Steel Framing
As a steel frame will be used to support the roof of the convention room, guidance by a skilled worker will be required for the treatment and welding of the connecting parts.

Metal Roofing
As long metal roofing materials will be used for the Center, careful installation work will be required.

Metal Windows and Doors
In view of the large number of metal windows and doors in the architectural

design, the dispatch of a skilled engineer will be necessary to complete the work in a short period of time.

Telephone Switchboard and Generator
The manufacturers' guidance will be required to ensure the proper installation of the equipment and instructions on its proper use should be provided.

Testing Equipment and Information Equipment – As above

5-3-3 Equipment and Materials Procurement Plan

(1) Construction Work

The following points should be especially noted at the time of procuring the equipment and materials for the construction of the Center.

1) Procurement in Japan

In the case of the construction-related equipment and materials to be procured in Japan, the manufacture of such made to order items as aluminum windows, steel doors, telephone switchboard, power distribution board, etc. will require some time in view of the order, design (approval), manufacture, packing and shipping stages involved. Therefore, order placement should be conducted in line with the progress of the construction work.

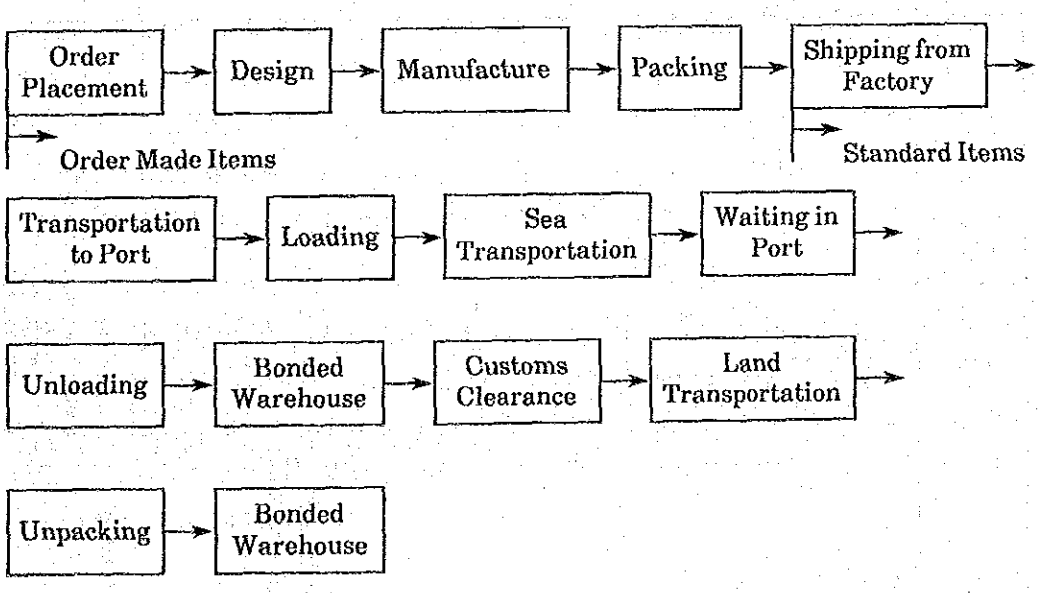


Table 5-3-1 Procurement of Equipment and Materials

Work	Materials/Equipment	Procured in		Remarks
		Philippines	Japan	
Structural Work	Sand	○		Easy to procure
	Aggregate	○		Easy to procure
	Cement	○		Abundant supply
	Concrete	○		F = 210kg/cm^2
	Re-Bars	○	○	Japanese product is cheaper
	Steel	○	○	Heavy steels procured in Japan
	Concrete Blocks	○		For non-bearing walls
Architectural Work	Timber	○		Many types of good quality
	Steel Door Frames	○	○	Use with local products
	Alum. Window Frames		○	Local products are inferior in terms of water tightness and air tightness
	Plaster	○		Abundant supply and skilled plasterers available
	Tiles	○		Few designs and colours
	Terrazzo Tiles	○		Good durability and workability
	Stones	○		Marble and granite
	Bricks	○		Few types but dressing bricks are available
	Paint	○	○	Japanese product for conc. paint
	Glass	○		Generally thinner than 6mm
Mechanical and Plumbing Work	Air-Conditioners		○	Types of local products are limited
	Pumps		○	Types of local products are limited
	Sanitary Ware	○	○	Local products, although Japanese products may be required depending on metal pipe combinations
	Steel Pipes		○	Sizes of local products are limited
	Conc. Pipes	○		
Electrical Work	Transformer	○		Pursuant to specifications by the electric company
	Telephone Switchboard		○	Not available locally
	Distribution Boards		○	Types of local products are limited
	Lighting Fixtures		○	Types of local products are limited
	Wires and Cables		○	Sizes of local products are limited
	Vinyl Pipes	○		

Since the unloading and customs clearance procedures at the port of arrival sometimes take an unexpectedly long time, the project implementation body should make the necessary arrangements to effect the smooth clearance of these procedures.

2) Local Procurement

Local procurement will be given priority for construction-related equipment and materials in order to simplify the procurement plan. In addition, this will also facilitate the maintenance of the completed facilities due to the local availability of spare parts. However, in the case of those items where the local supply capacity does not meet the Project requirements, their import from Japan should be considered.

3) Cost

A comparison will be made between the local purchase cost and the Japanese purchase cost and the cheaper equipment/materials will be chosen without sacrificing quality. Attention should be paid to the fact that the procurement cost in Japan should include packing, transportation and insurance costs but should exclude import taxes.

Based on the above considerations, the equipment and materials for the Center will be procured as shown in Table 5-3-1.

(2) Equipment-Related Work

Most of the equipment for the Center, including analysis and testing equipment and information processing equipment, is not produced locally and will, therefore, be imported from Japan. As a lot of this equipment is not mass produced but made to order, the equipment procurement plan should take the necessary time for design and manufacture into consideration.

Special attention should be paid to both the land and sea transportation of precision equipment and technical experts in the relevant fields should be dispatched to supervise the equipment installation. In the case of information processing equipment, a training period should be provided for the operators following equipment installation and prior to the commencement of actual operation.

5-4 Implementation Schedule

If grant aid cooperation is provided by the Government of Japan for the Project, three stages will be involved in the project implementation, i.e. preparation of the detailed design documents, tender and work agreements and actual construction of the Center, following the signing of the E/N by the Governments of the Philippines and Japan. The organization responsible for the signing of the E/N on the Philippine side will be the Department of Agriculture.

(1) Project Phases

In view of the size and contents of the Project, a relatively long time will be required for its implementation. In order to ensure its smooth implementation on the basis of the grant aid cooperation by the Government of Japan, therefore, it will be appropriate to divide the project period into two phases with the construction of the Main Building and the installation of the relevant equipment in Phase I and the construction of the Training and Information building and the installation of the relevant equipment in Phase II.

(2) Detailed Design

The tender documents will be prepared based on the Basic Design and will consist of the detailed design drawings, specifications, detailed cost estimate, budget, etc. Close consultations with the related organizations on the Philippine side will be necessary at the preliminary, intermediate and final stages of the detailed design. The tender procedure will commence after the specifications and necessary aspects of the finalized Project-related items have been approved by the Philippine side. The entire detailed design procedure is expected to require three and a half months.

(3) Tender

Following the completion of the detailed design, the preliminary qualification examination of tenderers (P/Q) will be publicly announced in Japan. Based on the examination results, the project implementation body will request open tenders from eligible tenderers. When the contents of the tender with the lowest cost have been approved, the respective tenderer will be declared successful and will subsequently sign a work agreement with the Government of the Philippines. The period between the tender

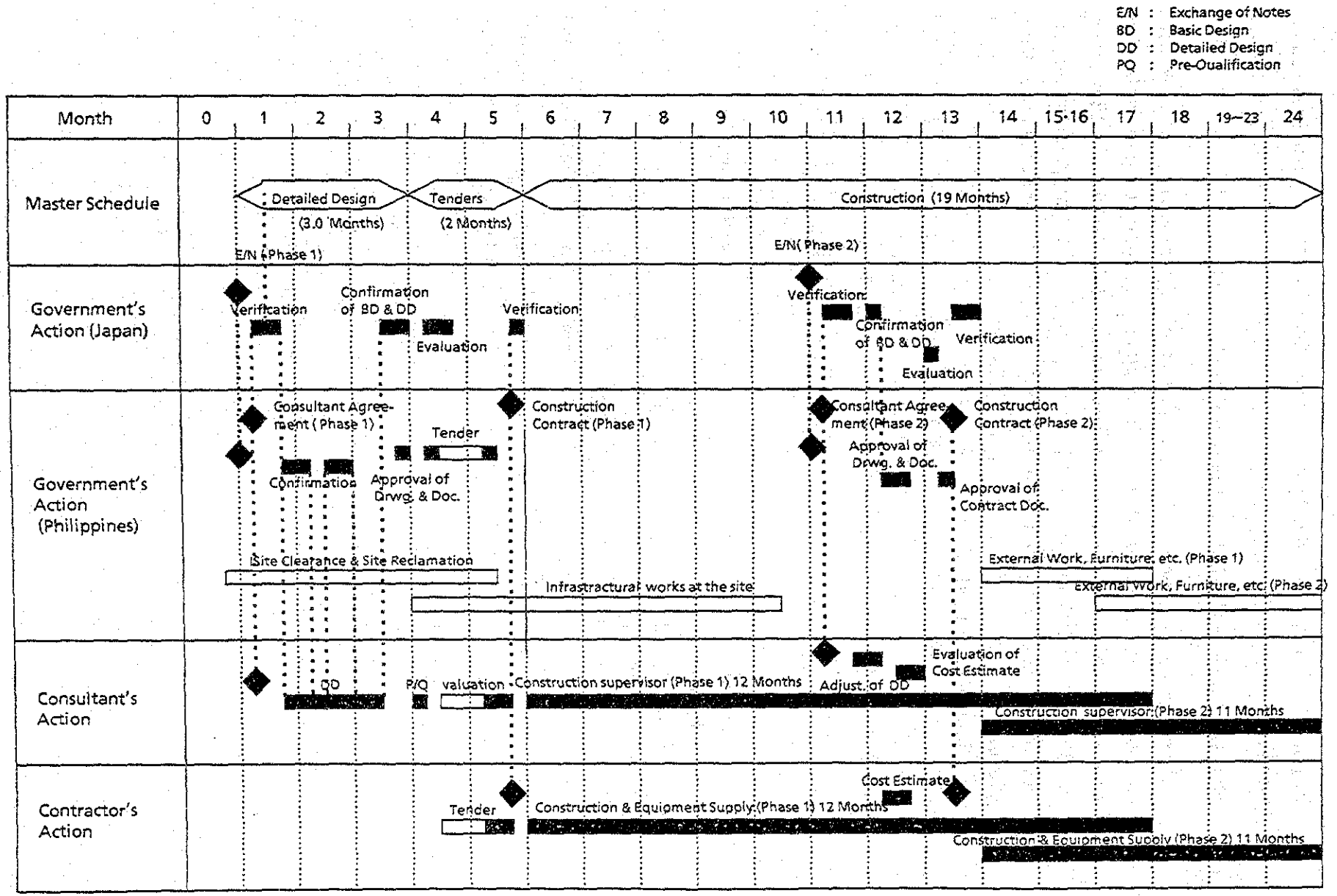


Fig. 5-4-1 Project Implementation Schedule

announcement and the signing of the work agreement is expected to require two months.

(4) Construction and Equipment-Related Work

Following the signing of the work agreement, the construction work will commence with the approval of the Government of Japan. In view of the size and contents of the Project, the expected construction periods are 12 months for Phase I and 11 months for Phase II, provided that the procurement of the construction equipment and materials is smoothly conducted and that the preparation work for which the Philippine side is responsible is completed without delay.

5-5 Estimated Construction Cost of the Philippine Side Work

The Government of the Philippines has already estimated its share of the project cost as shown below and plans to appropriate the necessary funds from its Special Account as soon as the Government of Japan approves the provision of the grant aid cooperation for the Project.

Banking and Land Preparation	475,200 P
Landscaping	1,080,000 P
Perimeter Fence	972,000 P
Electricity Extension to the Site	216,000 P
City Water Extension to the Reservoir Tank	200,000 P
Drainage Connection from the Site	432,000 P
Telephone Extension to the Site	972,000 P
Furniture and Fixtures	17,496,000 P
Transfer of Existing Equipment	216,000 P
Repair of Existing Facility	1,966,000 P
Reserve	3,278,880 P
Work Supervision	1,759,666 P
Total	29,063,746 P

According to the estimate of the Study Team, the above budget is adequate to carry out the Philippine side work.

Although the above total does not include bank commissions, these can be easily paid from the reserve funds.

CHAPTER 6. MANAGEMENT AND MAINTENANCE PLAN

CHAPTER 6 MANAGEMENT AND MAINTENANCE PLAN

6-1 Operation and Management System

Following the construction of the Center and its handing over to the Government of the Philippines, the BSWM of the Department of Agriculture will be reorganized to the Center and, with the expansion and consolidation of its organization, will act as the Center's management body. Reorganized as the Soil Research and Development Center, the BSWM will play a central role in soil research and development work, smoothly implementing such project objectives as described in Chapter 4 as surveys, research, development, information service and training activities, and it will continue to be under the jurisdiction of the Department of Agriculture in terms of its budget and control.

Together with the provision of the facilities and equipment under the Project, project-type technical cooperation by the Government of Japan is also planned. The preparation of a plan to make the Philippine side capable of managing and maintaining the facilities and equipment following the completion of the technical cooperation and the establishment of an appropriate system will be necessary. The strengthening of the management and maintenance system for the Center will be of particular importance to achieve the efficient utilization of the information processing equipment, as well as the implementation of highly precise experiments and research, in view of the fact that the Center will be one of the central research and development institutes in the Philippines.

The overall management and maintenance of the Center will be in the hands of the Administration Department and full-time engineers and operators should be provided for the electrical, air-conditioning and sanitary equipment and other special equipment. In regard to the maintenance of the highly precise research and information processing equipment, a system should be established whereby its regular maintenance, inspection and repair is commissioned to private companies specializing in the respective fields.

Engineers of the BSWM are currently responsible for the maintenance and repair of facilities and equipment while the Building and Repair Section is responsible for building repairs. With the completion of the Project, however, the Center will have the most superior equipment among all organizations of the Department of Agriculture and, therefore, it is strongly desirable that the training of full-time engineers for the Center can be provided to match the importance of its activities.

In addition, the maintenance staff should be present at the time of the installation and adjustment of the equipment so that they can obtain a better understanding of the relevant systems, in view of smoothly conducting maintenance work following the handing over of the Center to the Philippine side.

6-2 Facility and Equipment Management and Maintenance Plans

6-2-1 Facility Management and Maintenance Plan

(1) Buildings

The three pillars of the building management and maintenance will be daily cleaning, the repair of abrased, damaged or deteriorated sections and security activities.

The promotion of daily cleaning will favourably affect the attitude of the staff members vis-a-vis their careful use of the facilities. In addition, cleanliness is a necessary condition for research facilities. With daily cleaning, the early detection of damage or failure will be possible, facilitating early repair and prolonging the lives of the building fixtures and research equipment.

The main component of the repair work will be the repair or improvement of the interior and exterior finishing materials protecting the buildings. It is expected that it will be necessary to redecorate or remodel the buildings every ten years or so due to changes in activities or an increase in staff, etc. While details of the items, determining the actual lives of the buildings, for which regular checks and repairs should be conducted will be provided in the maintenance manuals at the time of handing over the buildings, they are outlined below.

Item	Frequency	
(Exterior)		
Exterior Repairs and Repainting	every 5 years	
Check, Repainting and Repair of Roof	annually	(check)
	every 5 years	(others)

Check and Repair of Roof's Waterproofness	annually (repair) as required	(check)
Cleaning of Drainpipes	monthly	
Check and Repair of Sealing of Windows and Outside Doors	annually	
Repainting of Windows and Outside Doors	every 5 years	
Check and Cleaning of Ditches and Manholes, etc.	monthly	
Repainting of Perimeter Fence	every 5 years	
Trimming of Trees and Gardening Work	as required	

(Interior)

Redecoration of Interior	as required	
Repair and Repainting of Internal Walls	as required	
Replacement of Ceiling Materials	as required	
Check of Windows and Doors and Replacement of Building Hardware	annually as required	(check) (replacement)

In regard to security activities, the checking of all visitors to the Center, especially those to the Survey and Research Divisions and the Information Processing Division where precision and safety are of the highest concern, should be thoroughly enforced. In addition, measures to prevent the theft of research and information processing equipment should be provided.

(2) Building Utilities

As well as daily operation control and regular checks, maintenance work involving repair and parts replacement will be required for the building utilities. The operational lives of the building utilities can be prolonged by their proper operation and daily checks, oiling, adjustment, cleaning and repair. In addition, measures to prevent breakdowns and accidents should be introduced without causing any adverse effect on the safety of the buildings. At the time of regular checks, overhaul and the replacement of worn parts should be conducted, pursuant to the maintenance manuals.

Those responsible for the control of the Center's utilities should have a thorough knowledge of the relevant systems, capacities, etc. For this purpose, a full-time maintenance engineer should be assigned for each of the electrical, air-conditioning, plumbing and special equipment systems. These engineers should undergo on-site training throughout all stages of equipment installation and adjustment to obtain an indepth knowledge of the systems by the time of the Project's completion. While operation manuals will be provided at the time of handing over the buildings, the general life expectancies of the main equipment are as follows.

(Electrical)

Power Generator	15 – 20 years
Distribution Boards	20 – 30 years
Fluorescent Lamps	5,000 – 10,000 hours
Incandescent Lamps	1,000 – 1,500 hours
Telephone Switchboard	40 years
In-House Broadcasting Equipment	10 – 20 years
Elevators	20 years

(Water Supply and Drainage)

Pumps, Pipes, Valves, etc.	10 – 15 years
Tanks	15 – 20 years
Sanitary Fixtures	25 years
Fire-Fighting Apparatus	20 years
Gas Apparatus	6 years
Waste Water Treatment Equipment	7 years

(Air-Conditioning)

Pipes	10 – 15 years
Fans	10 – 15 years
Air-Conditioners	5 – 10 years

6-2-2 Equipment Management and Maintenance Plan

(1) Testing, Analysis, Information Processing and Research Equipment

The daily maintenance of testing, analysis, information processing and research equipment is extremely important to ensure the precision of this equipment, which directly affects the research activity results of the Center. As this equipment is generally fragile and liable to damage due to vibration, shock, temperature changes or humidity because of the precision parts used, it should be handled with the utmost care.

In this context, while the daily maintenance responsibility for general-purpose equipment will be in the hands of the users, specialized technicians will be required to conduct the regular maintenance and repair of that equipment involving specialized knowledge and skills. In the case of such special equipment as computer-related equipment and X-ray analyzers, it will be necessary to conclude maintenance agreements with the agents of the manufacturers.

Checks should be conducted as outlined below. The detailed check items and frequencies will be provided in the operation manuals when the equipment is handed over to the Philippine side.

	In-House Work		Check by Outside
	Cleaning	Check	Specialists
General-Purpose Testing Equipment	monthly	biannually	annually
Analysis Equipment	weekly	quarterly	biannually
Optoengineering Equipment	daily	weekly	annually
Separation Equipment	daily	weekly	annually
Computer	daily	daily	3 times a year
XY Plotter, etc.	weekly	monthly	at time of reapir
Audio Visual Equipment	daily	monthly	3 times a year
Printing Equipment	daily	weekly	annually

(2) Expendables and Chemicals for Research Use

An appropriate inventory control should be established and the supply of the expendables and chemicals required for the research activities to the departments/divisions should be uniformly and systematically conducted by the Administration Department. As some items are not available in the Philippines, some time may be required for their procurement and, therefore, procurement arrangements should be made in advance, especially for the items given below.

- Glassware for Laboratory Use
- Ceramics for Laboratory Use
- Metalware for Laboratory Use
- Chemicals for Laboratory Use
- Rubber and Plastic Apparatus for Laboratory Use
- Spare Parts for Research Equipment
- Expendables for Printing

6-3 Management and Maintenance Cost Estimate

Here, the management and maintenance cost to be borne by the Philippine side following the completion of the Project is estimated. The subject items are the personnel, utilities, repair, maintenance and miscellaneous costs.

(1) Personnel Cost

The estimated personnel cost for 1990 when the Center will commence its new activities is given below based on the personnel plan of the Philippine side. The average annual salaries are based on the survey results plus an increase of 10%.

Permanent staff	474	9,348,000 P
Additional positions	42	887,000 P
Casual staff	197	2,272,000 P
Allowance	--	5,476,000 P
Total	713	17,983,000 P

(2) Utilities Cost

The annual utilities cost (electricity, water and LPG) is calculated on the basis of the assumed normal consumption volumes.

1) Electricity Cost

a. Assumed Maximum Power Supply
The total power load capacity of the Center is approx. 1,100 KVA while the planned transformer capacity is approx. 1,000 KVA (1,100 KVA × 0.8 = 880 = 1,000). As the maximum power requirement is assumed to be some 40% of the transformer capacity, the maximum power supply will be 400 KW (1,000 KVA × 0.4 = 400).

b. Assumed Monthly Power Consumption Volume
1,000 KVA×0.8×0.4×20 days×10 hours=64,000 KWH/month

c. Calculation of Electricity Bill

① Basic Fee

88,000 KWH × 0.951 × 1.63P = 136,400P/month. . . (a)

② Additional Charges

– Demand Charge (Meter Rate): 400 KW × 12.6P = 5,040P

– Energy surcharge: 88,000 KWH × 0.951 × 0.27P = 22,595P

Total 27,635P . . . (b)

③ CERA

27,635P × 0.129P = 3,564P . . . (c)

Monthly Electricity Bill:	(a)+(b)+(c)=	167,599P
Annual Electricity Bill:	167,599×12=	2,000,000P

2) Water Cost

Monthly Consumption Volume

120m³/day × 20 days/month = 2,400m³

Basic Charge		
–25m³		117.7P
26m³–1,000m³	975m³ × 4.7075P/m³ =	4,589.8P
1,000m³–	1,400m³ × 5.6105P/m³ =	7,854.7P
	Sub-Total	12,562.2P
CERA	2,400m³ × 0.072P/m³ =	172.8P
Environmental Charge		
	(12,562.2+172.8)P × 0.1 =	1,273.5P
	Total	14,008.5P
Annual Water Bill :	14,008.5P/month × 12 =	168,102P

3) LPG Cost

Daily Consumption

Experiments

174 (researchers) × 10,000kcal/person ÷ 12,000kcal/kg = 145kg/day

145kg/day × 20 days/month × 12 months × 7.82P/kg = 270,000P/year

Total Utilities Cost: 1) + 2) + 3) = 2,000,000P + 168,000P + 270,000P

= 2,438,000P/year

(3) Maintenance Cost for Building Utility and Equipment

1) While the cost of building repairs changes with the passing of time, the calculation is based on an assumed average cost of 80P/m^2 over a 30 year span.

80P/m^2/year × 11,656m^2 = 932,000P/year

2) The utilities repair cost will be nominal in the first 5 years or so but will later increase because of the necessary replacement of parts or utilities. The average annual cost over a 10 year span is calculated here assuming a repair cost of 2% of the original utilities cost.

65,334,000P × 2%/year = 1,307,000P/year

3) Equipment Maintenance Cost
Although the equipment maintenance and repair cost largely varies depending on the frequency of use and the number of years in use, three times of the expenditure for equipment in 1987 is assumed here. The total amount of US$36,000-/year for computer maintenance contract is included in the above.

9,587,000P/year

4) Security Service Contract 576,000P/year

5) Janitorial Service Contract 240,000P/year

Total: 1) +2)+ 3) + 4) + 5) = 12,642,000P/year

(4) Operations Cost

1)	Travelling Expences	13,600,000P/year
2)	Contractual Labour for Field Activities	2,026,000P/year
3)	Contract for Remote Sensing Tapes	4,000,000P/year
Total: 1) + 2) + 3)		= 19,626,000P/year

(5) Consumables Cost

1)	Office, Laboratory Supplies and Chemicals	17,340,000P/year
2)	Gasoline, Oil and Spare Parts	7,000,000P/year
Total: 1) + 2)		= 24,340,000P/year

(6) Estimated Total

1)	Personnel Cost	17,983,000P/year
2)	Utilities Cost	2,438,000P/year
3)	Maintenance Cost	12,642,00P/year
4)	Operations Cost	19,626,000P/year
5)	Consumables Cost	24,340,000P/year
Total: 1) + 2) + 3) + 4) + 5)		77,029,000P/year

The estimated total annual maintenance cost is 77,029,000P. As shown in Table 6-3-1, this is 32% higher than the BSWM's working budget for Fiscal 1988 of 58,524,000P. However, no problems are anticipated in securing this amount in the starting year of 1990 in view of BSWM's budgetary increase of about 20% a year in the past three years.

Table 6-3-1 Working Budgets of Department of Agriculture and BSWM (Unit: 1,000P)

	1985	1986	1987	1988
DOA	1,345,233	1,573,788	2,168,025	2,179,153
BSWM	29,028	36,762	43,319	58,524