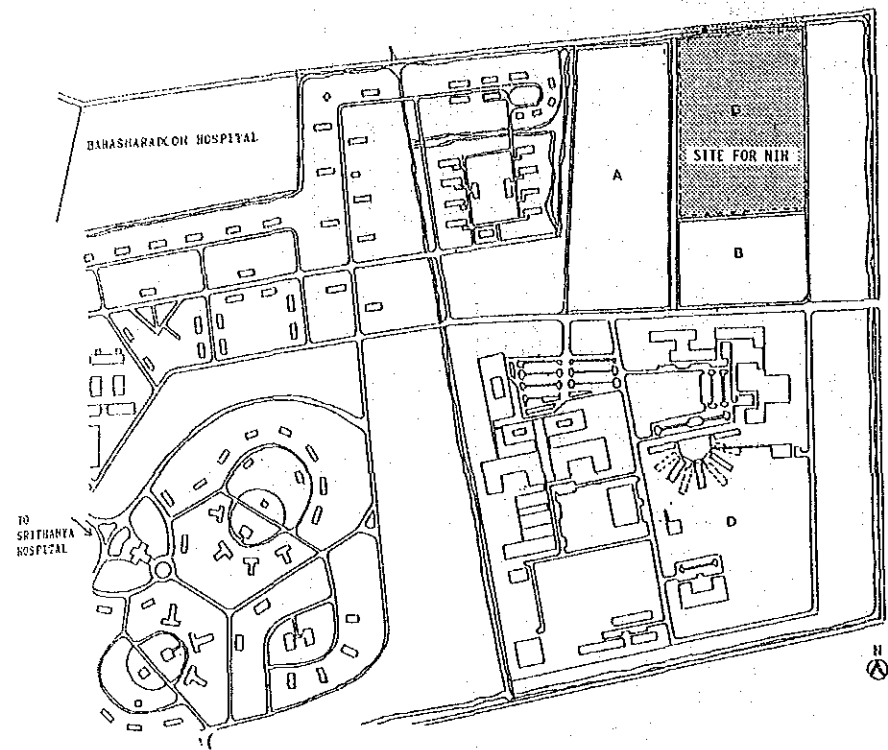
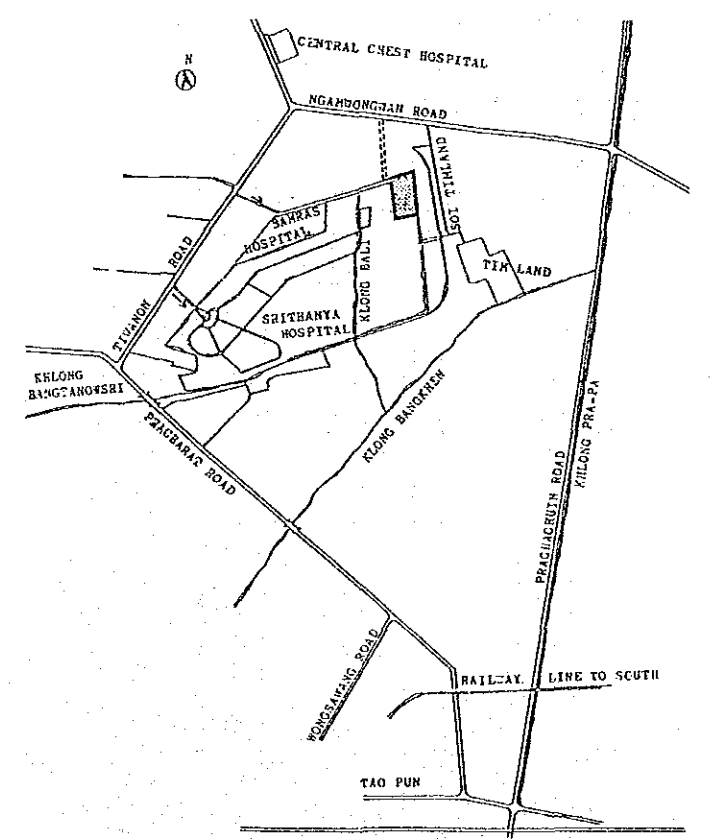


4-4-2 Basic Design Drawings

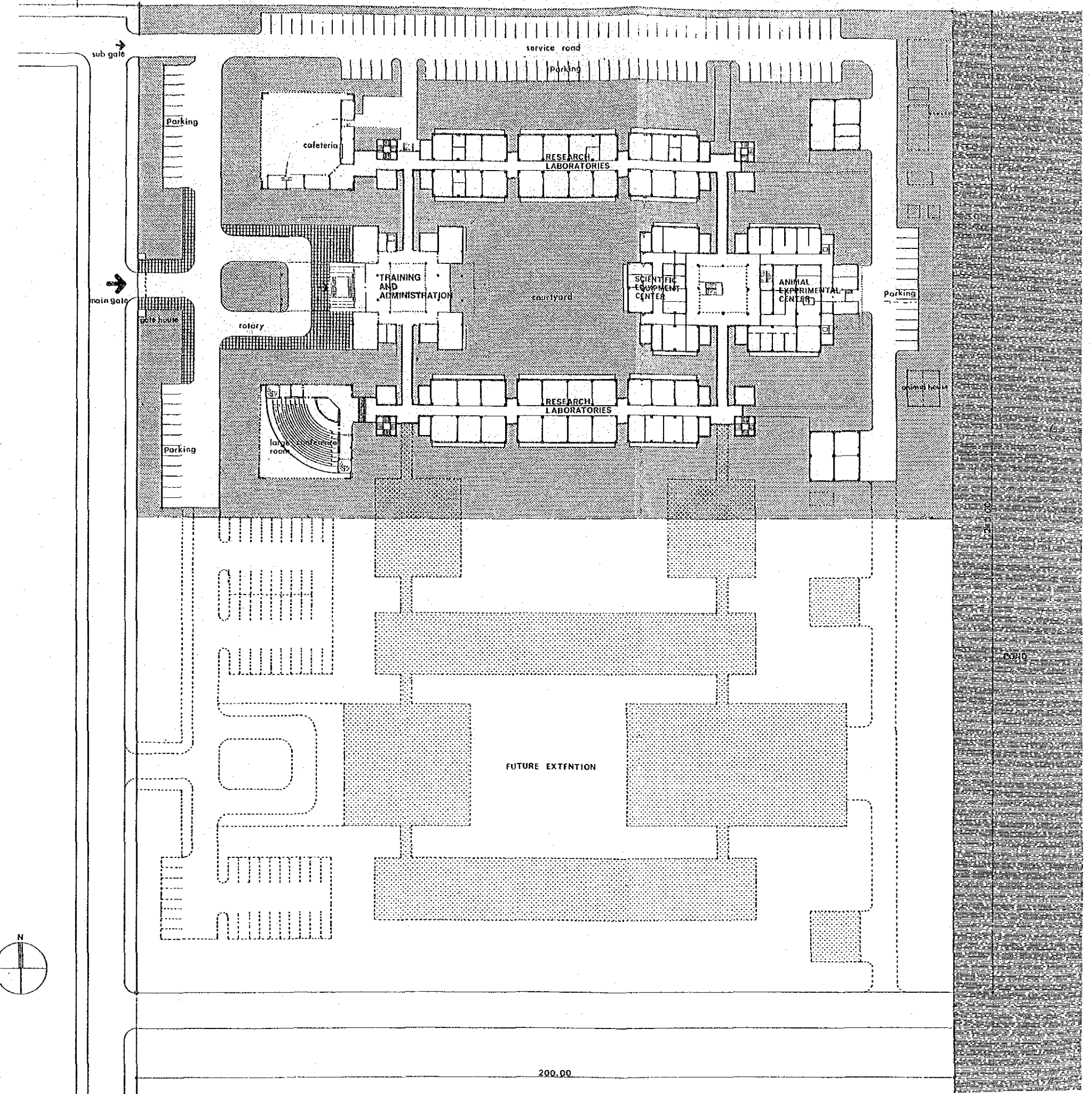
- (1) Location Map, Site Plan
- (2) First Floor Plan
- (3) Second Floor Plan
- (4) Third Floor Plan
- (5) Elevations
- (6) Elevation, Section
- (7) Sections



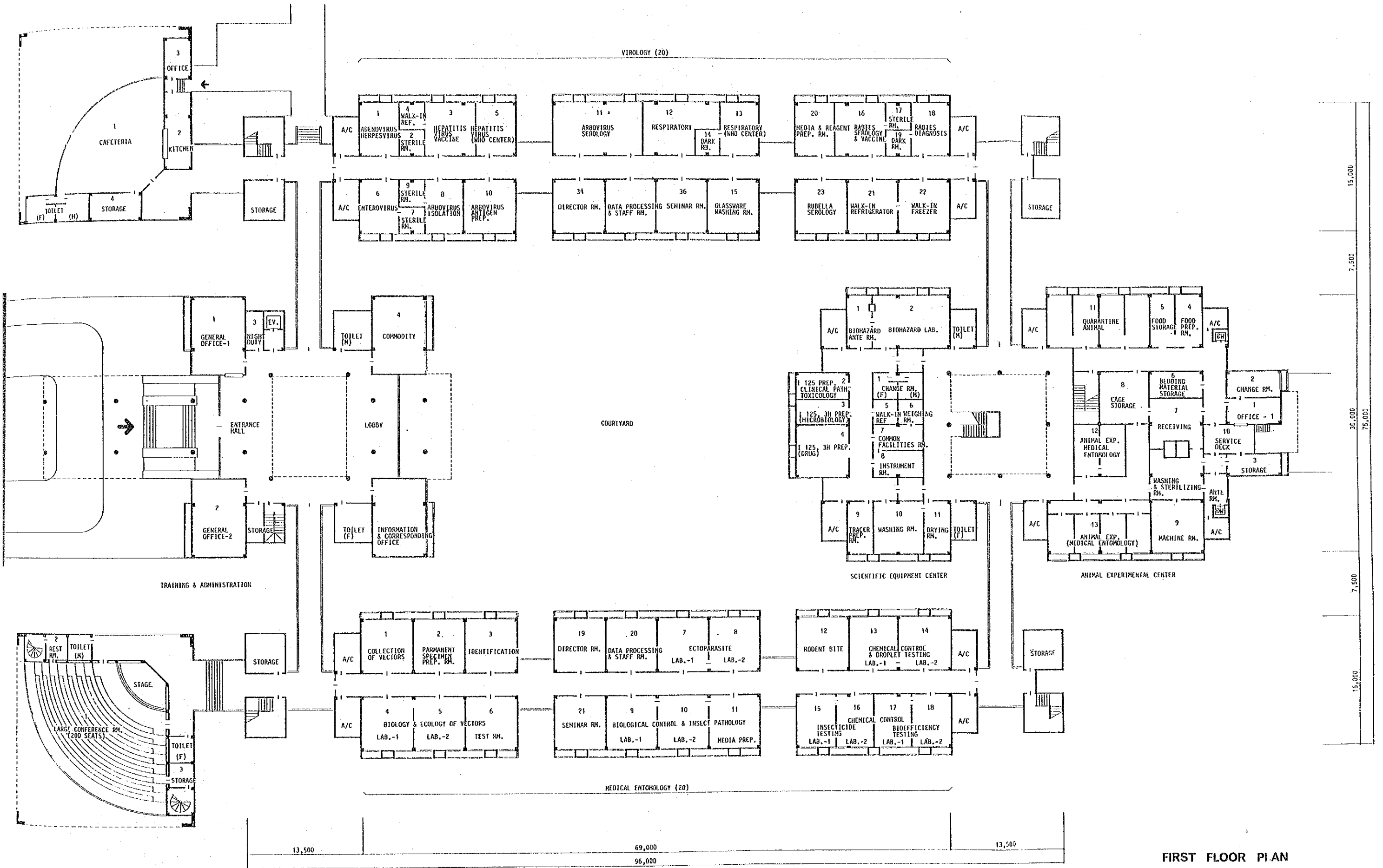
- A: DEPT. OF C.D.C.
- B: OFFICE OF THE PERMANENT SECRETARY
- C: NIH. DEPT. OF MEDICAL SCIENCES
- D: MEDICAL SERVICE RESEARCH CENTER
DEPT. OF MEDICAL SERVICE

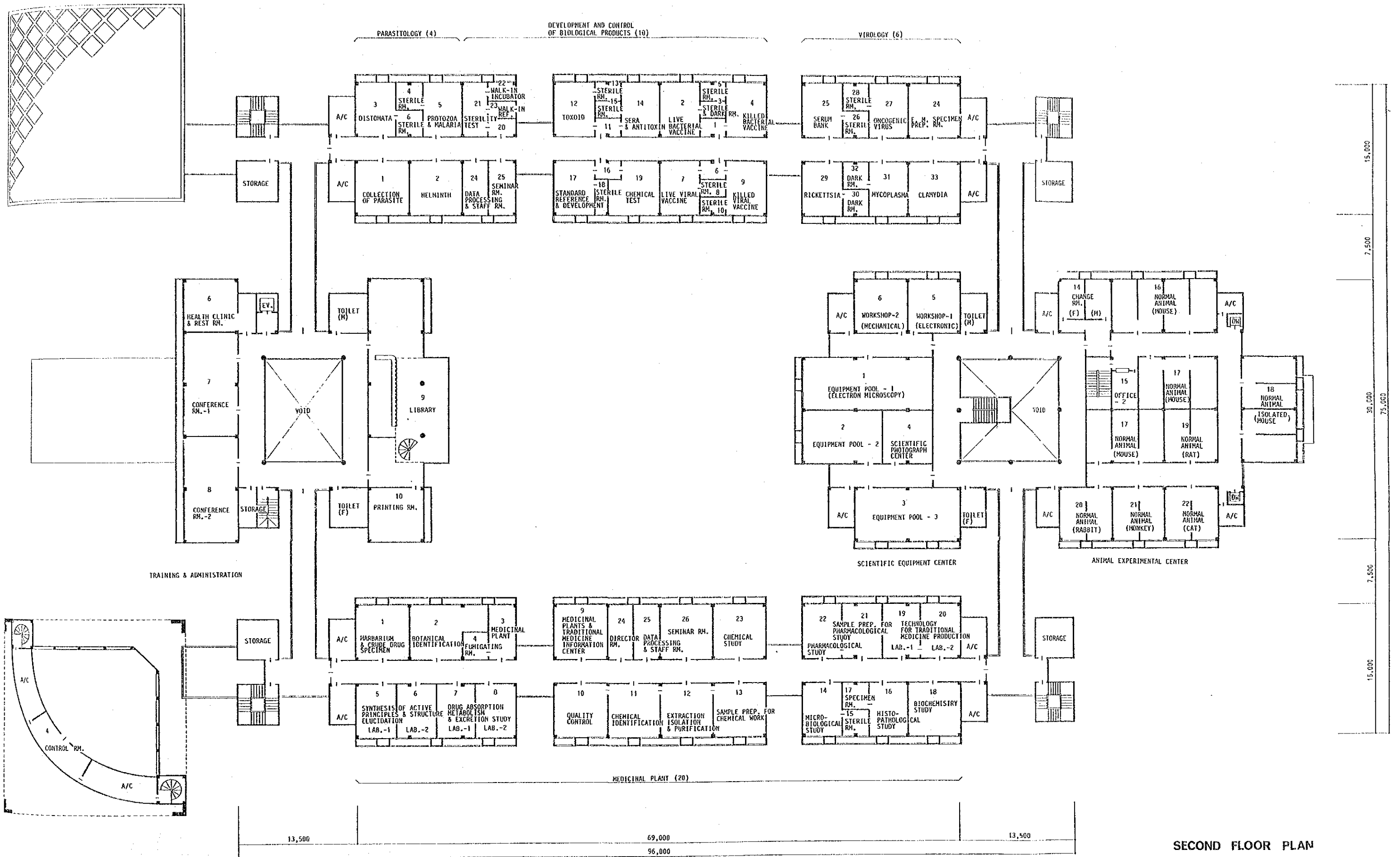


LOCATION MAP

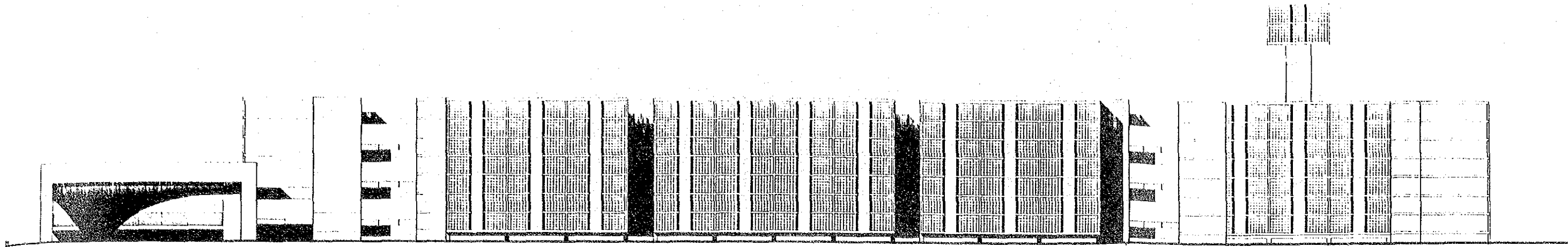


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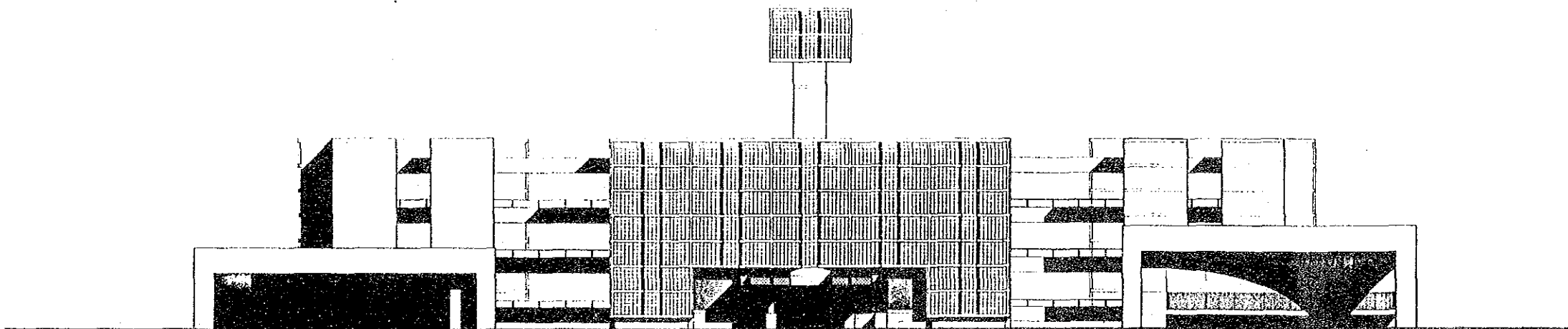




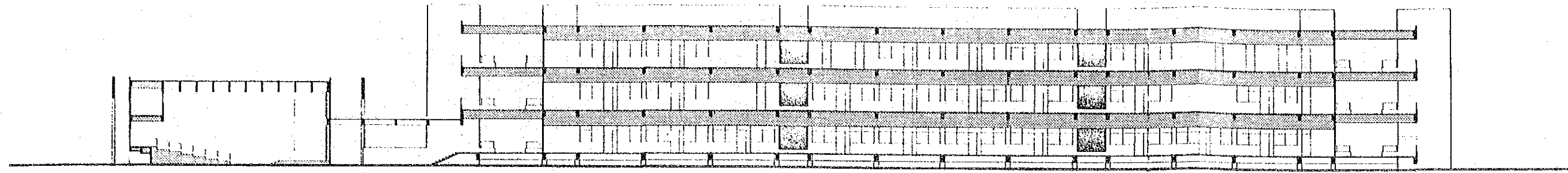
SECOND FLOOR PLAN



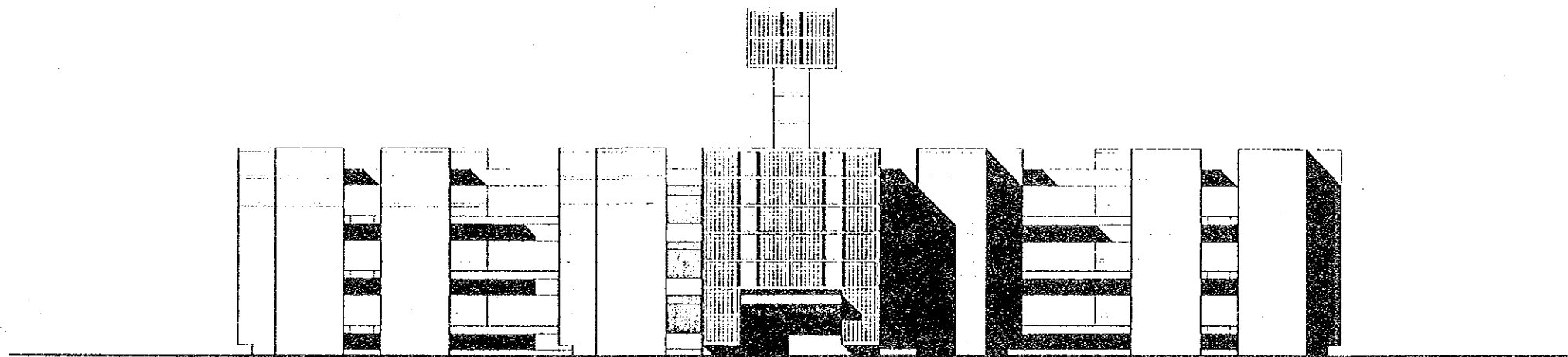
ELEVATION



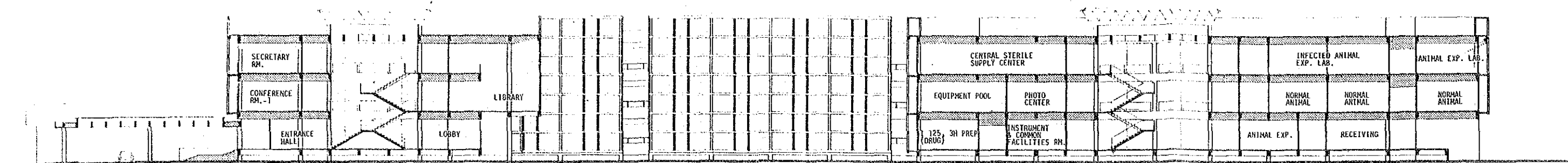
ELEVATION



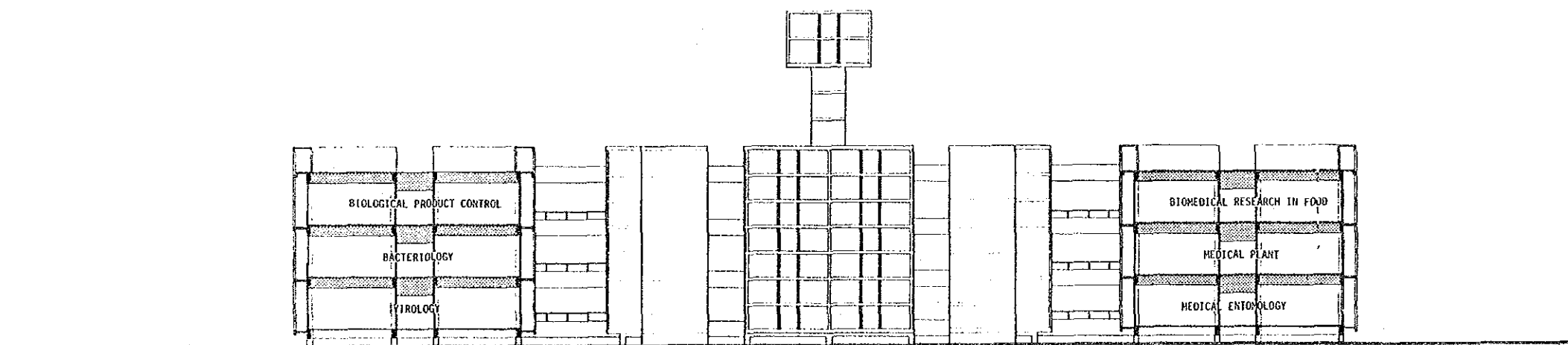
SECTION



ELEVATION



SECTION



SECTION

CHAPTER 5: OPERATION AND MAINTENANCE PLAN

CHAPTER 5: OPERATION AND MAINTENANCE PLAN

5-1 OPERATION PLAN

5-1-1 Mode of Operation

DMS will be the executing agency of operation and maintenance of the facilities and equipment for the Project, after they are completed and turned over to Thailand. While the institute will be operated as an independent national research organization with its research activities, organization and personnel placement aligned with the objectives stated in Chapter 3, it is to be positioned as an organization belonging to DMS, Ministry of Public Health, in terms of operation and maintenance and budgeting.

It follows that, if the present organization and personnel placement of DMS is to remain unchanged, full realization of the functions of NIH, as expected, will be difficult, thus necessitating a structural reformation, such as reorganization of DMS into one part mainly engaged in the former "test and examination" and NIH mainly engaged in the new "research activities". The mode of operation of NIH, together with the reorganization of DMS is now under review, and is to be implemented as indicated in 3-4-1 "Organization".

However, in order to develop a mode which will facilitate the function of NIH, further concrete programing on the mode of operation including organization and personnel placement will be necessary,

respectively for research divisions in the current DMS to be transferred to NIH, those to be partially transferred and those to be newly created such as the Immunology Unit, Scientific Equipment Center and Animal Experiment Center. An Administration Division, although not included in the foregoing organization, is obviously necessary.

5-1-2 Personnel Plan

DMS, as the parent body of NIH, is a major organization with a total number of staff amounting to 986 consisting of 558 scientific staffs, 116 general administrative staffs, and 312 workers, almost half of which are to be transferred to NIH at the time of its foundation.

Researchers are, as it were, props of research activities with respect to the research results, and it is essential to intentionally promote and to secure their abilities and manpower, based on long-term prospects.

The personnel plan of NIH upholds three items as follows:

1. More doctors of philosophy in several fields of medical sciences are needed.
2. Professional trained personnel in the following fields are needed; computer science, statistics, maintenance, etc.
3. Recruitment of new personnel will be at least 2% of the total number. However, in case of the project is already in progress, the number of new personnel might be increased as necessary.

In the activity program of NIH, education and training program in respective special fields for senior class researchers and technical staffs were established and systematic training and personnel placement seem to be considered.

The total number of staff of NIH at the time of its foundation is scheduled to be about 445 as shown in 3-4-2 "Personnel Plan".

The estimated number of staff five years and ten years after the foundation of the above personnel program are as follows:

Time Category	Time of Foundation (1986)	5 Years After	10 Years After
Research Laboratories (Researchers, Assistants, Workers)	361	396	436
Scientific Equipment Center and Animal Experiment Center	40	45	50
Training/Administration (including Technicians)	44	49	54
Total Number of Staff	445	490	540

Table 5-1-2 Personnel Program in NIH

5-1-3 Operation and Maintenance Costs Plan

Operation costs for NIH is now under examination in DMS, and its rough budget allocation program is as follows:

Total Budget		100%
Breakdown	1. Salary for Staff	60%
	2. Running Cost for Facilities and Research Equipment, etc.	20%
	3. Operation Cost for Supplies, Transportation Services, training Seminars and Publications, etc.	20%

The above budgetary measures seem to be appropriate compared with the total expenditure budget of DMS for 1984 (October 1983 to September 1984) as follows:

Item	Cost Amt. (₱)	Percentage	
1. Salaries and Wages	47,197,900	61.9%	
2. Public Services (Electricity, Telephone, Water, etc.)	3,110,000	4.1%	14.5%
3. Equipment (Research Equipment, parts, expendables and drugs)	7,960,100	10.4%	
4. Supplies, Travel Expenses, Overtime, etc.	10,959,600	14.5%	23.6%
5. Cost for Construction (Construction of Regional Medical Sciences Center, etc.)	5,504,000	7.2%	
6. Subsidies and Others	1,478,800	1.9%	
Total	76,210,400	100%	

Table 5-1-3 Expenditure Budget of DMS for 1984

Average monthly income per person is calculated from Salaries and Wages and Total Number of Staff as follows:

$$\begin{aligned} & \text{¥47,197,000 / Total Number of Staff} && 986 / 12 \text{ months} \\ & = \text{¥3,989/person, month} \end{aligned}$$

Similarly, annual gross expenditure per person is calculated as follows:

$$\begin{aligned} & \text{¥76,210,400/year / Total Number of Staff} && 986 \\ & = \text{¥77,292/person, year} \end{aligned}$$

5-2 MAINTENANCE PLAN

5-2-1 Maintenance Plan for Facilities

(1) Buildings

Maintenance of buildings mainly consist of daily routine maintenance such as cleaning, reconditioning of wear and tear due to utilization and deterioration arising from breakage and aging, and guarding against crimes. For routine maintenance, scrupulous and frequent cleaning, prompting the careful usage and early discovery of breakage and defects of the buildings and will ultimately result in the prolonged life of facilities, utility service equipment and research equipment.

Regular service of 8 to 10 persons will be necessary for the cleaning of the facilities.

As to repairs, provided that the expected life span of the buildings of the Project is 30 years, the repair works involving the structural components will not be necessary, it will be mainly executed regarding interior and exterior finishing. Remodeling and modification will be required by the mode of operation of the users of buildings such as the alteration of the objectives of the buildings, increase in the staff number, and alteration of research activities. It is necessary to appoint persons in charge of facility control from the Administration Unit and to secure for systematic inspection and reconditioning.

In the inspection and repair of buildings, periodical execution of the following items is recommended.

(exterior)

Repair and repainting of exterior finish and inspection of cracks
caused by neutralized concrete

..... (once / 5 years)

Repair, repainting and inspection of roof slab

..... (inspection: once / year)
..... (others: once / 5 years)

Inspection and partial repair of roof

waterproofing (inspection: once / year)
..... (others: as occasion calls)

Periodical cleaning of downspouts, drains, etc.

..... (once / month)

Inspection, repair of sealing of exterior doors and windows

..... (once / year)

Repainting of exterior doors and windows

..... (once / 5 years)

Periodical inspection and cleaning of drainage gutters,
manholes, etc. (once / 5 years)

Repainting of surrounding fences

..... (once / year)

Periodical checkup of landscaping

and gardening (as occasion calls)

As to guarding, it will be necessary to form a guarding system
mainly aiming at the prevention of theft of research equipment,
utility service equipment, research results and materials, dange-
rous articles, etc. by the execution of checking of incoming and
outgoing facility users and of carrying-in and out of articles, and
around-the-clock patrols.

(2) Utility Service Systems

With respect to the various utility service systems such as electrical, air-conditioning and ventilation, plumbing, special facilities and elevator, etc., in addition to daily operation control and periodical inspection to utility service equipment, maintenance such as repair in case of failure is necessary. It is important to form a maintenance system preventing failure and accidents and securing the smooth operation of facilities by operating the equipment properly and executing daily inspection, lubrication, adjustment, painting and repair. Utility service systems of NIH is, with respect to their purposes, to be highly graded compared with other facilities. At least six technicians, as maintenance personnels, consisting of 2 for electricity, 2 for air-conditioning and ventilation and 2 for plumbing are considered to be necessary securing the standing technicians versed in the functions of facilities as stated above. Utility service equipment are to be periodically overhauled, degenerated parts are to be replaced, and each equipment is to be inspected and maintained with the predetermined periods from several months to several years. The general equipment themselves are to be replaced at the end of their life span indicated below:

Durable Years of Equipment

(Electrical Equipment)

Generator	15 to 20 years
Panel Board	20 to 30 years
Fluorescent Lamps	5,000 to 10,000 hours
Incandescent Lamps	1,000 to 1,500 hours
Telephone Exchange	40 years
Public Address System Equipment	10 to 20 years
Elevator	20 years
Dumbwaiter	15 years

(Plumbing Equipment)

Pumps	10 to 15 years
Tanks	15 to 20 years
Pipes and Valves	10 to 15 years
Plumbing Fixtures	25 years
Fire Extinguisher	20 years
Gas Equipment	6 years
Sewage Treatment Equipment	7 years

(Air-conditioning and Ventilation Equipment)

Pipes	10 to 15 years
Fans	10 to 15 years
Airconditioners	10 to 15 years
Package-type Airconditioners	5 to 10 years
Chilling Units	5 to 10 years

5-2-2 Maintenance Plan for Research Equipment, etc.

(1) Research Equipment

As the precision of research equipment supporting the research activities should always be kept at high levels, and as the objects of research usually possess dangerous material such as material causing diseases, thus requiring rigorous protection of researchers from dangers, daily maintenance and inspection over them are essential.

The significance of the maintenance system for research equipment being as mentioned above, we consider that the system adopted in the establishment of NIH is appropriate as it aims at efficient operations centralizing daily maintenance and inspection, repair, research development, and new purchase to be executed solely by the Scientific Equipment Center. It will be necessary for the Scientific Equipment Center to maintain a staff of expert technicians skillful in the mechanism of research equipment, for the daily maintenance and inspection, examination on purchase of new apparatus, and research development. A combined system is necessary where daily maintenance, inspection and repair are generally executed by the technicians of the Scientific Equipment Center, leaving specific kinds of equipment to maintenance services under contract with other organizations such as the manufacturers of the equipment. Periodical execution of daily maintenance and inspection is advisable with respect to the following items. The necessary cost for parts, if executed by the internal staff, and trans-

portation fee, and fee for dispatched engineers as well as costs for parts, in case of outside order, should be taken into account in the budget.

	Internal Execution	Outside Order
Experimental apparatus for general use	(4 times/year)	(once/year)
Analytical apparatus	(inspection only, 4 times/year)	(twice/year)
Optical apparatus	(twice/year)	(once/year)
Isolation, analytical apparatus	(inspection only, regularly)	(once/year)
RI & biohazard experimental apparatus	(twice/year)	(once/year)
Precision research apparatus	(inspection only, regularly)	(twice/year)
Sterilization apparatus	(3 times/year)	(once/year)

(2) Expendable Materials and Chemicals for Research

Expendable materials and chemicals substantially support the daily research and experiment activities, so that necessary quantity for each research unit is to be purchased and replenished periodically. As to actual operations, the centralized operation system through the introduction of computers may be useful for such activities as purchase, distribution of units concerned, inventory control and collaboration. As the central supply center, the Scientific Equipment Center and the Procurement Section of the Administration Unit are expected to coordinate in those activities.

The following is the list of applicable expendable materials and chemicals.

Glassware for experiments
Reagents for research
Culture medium for research
Antigen and antisera for research
Complemental expendable materials
RI reagents
Expendable parts for research apparatus
Special gas for experiments
Antiseptics and other chemicals

(3) Animal Experiment Center

While being planned as a joint utilization facility, the Animal Experiment Center should be operated, with respect to the daily maintenance, by responsible administrator and requisite expert staffs. The gist of its operation is maintenance of the living conditions of animals, and taking rigorous preventive measures for mutual infections between animals as well as between animal and human, leading to the significant securing and sustaining of high precision for research experimental activities conducted here.

Regarding operation and maintenance at the Center, specific plans for the following items should be examined and requisite cost for them should be secured in the budget.

- 1) Animal Purchase and Breeding Plans
- 2) Feed Purchase and Compounding Plans
- 3) Supplementary Material Plans
- 4) Animal Disposal Plans

5-3 ESTIMATED COSTS FOR OPERATION AND MAINTENANCE

Estimation was made on the annual costs required for operation and maintenance of the facilities and equipment, to be covered by Thailand after the completion of NIH. The items are divided into Personnel Costs, Running Costs for Facilities, Cleaning/Guarding Costs, Maintenance Costs for Research Equipment, etc. and calculations are based on the prices as of February 1984.

(1) Personnel Costs

Estimation will be made on Personnel Costs, which will take up a major part of the operation and maintenance costs of NIH, according to the personnel plan and operation and maintenance plan for NIH at the time of its foundation, outlined in 5-1 "Operation Plan". The estimated average salary per employee is ¥4,000/person, month.

No. of Employees at the time of foundation	445 persons x ¥4,000/person mon x 12 mon = <u>¥21,360,000/year</u>
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(2) Running Cost for Facilities

Quantities to be consumed for water, electricity, LPG, fuel oil and special gas are estimated from the presumed daily usage, for calculating the annual running cost for the facilities.

1) Water

$$230 \text{ m}^3/\text{day} \times 365 \times 5/7 \text{ day} \times \text{P}5/\text{m}^3 = \text{P}299,900/\text{year}$$

$$40 \text{ m}^3/\text{day} \times 365 \times 2/7 \text{ day} \times \text{P}5/\text{m}^3 = \text{P} 20,900/\text{year}$$

Sub-total

₱320,800/year

2) Electricity

Lighting/
Receptacles = $200\text{KW} \times 8\text{hr}/\text{day} \times 365 \times 5/7 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 667,500/year

Research
Equipment = $240\text{KW} \times 8\text{hr}/\text{day} \times 365 \times 5/7 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 801,000/year

Refrige-
ration
Equipment = $60\text{P} \text{ KW} \times 0.3 \times 24\text{hr}/\text{day} \times 365 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 252,300/year

Special
Aircondi-
tioners = $80\text{KW} \times 0.5 \times 24\text{hr}/\text{day} \times 365 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 560,700/year

General
Aircondi-
tioners = $240\text{KW} \times 8\text{hr}/\text{day} \times 365 \times 5/7 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 801,000/year

Ventila-
tors = $30\text{KW} \times 8\text{hr}/\text{day} \times 365 \times 5/7 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 100,200/year

Sewage
Treatment = $20\text{KW} \times 8\text{hr}/\text{day} \times 365 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 280,400/year

Water
Supply = $30\text{KW} \times 3\text{hr}/\text{day} \times 365 \times 5/7 \text{ day} \times \text{P} 1.6/\text{KW}$
= ₱ 37,600/year

Demand
Charge = $900\text{KW} \times \text{P} 98 /\text{KW} \times 12 \text{ mon}/\text{year}$
= ₱ 1,058,400/year

Sub-total

₱ 4,559,100/year

3) LPG (Liquefied Petroleum Gas)

Research Experiment Rooms	100 x 300 Kcal/hr x 5hr/day/11,000 Kcal/kg x 365 x 5/7 day x ¥ 10/kg = ¥ 35,600/year
Kitchen	360L/day x 700 Kcal/L/11,000 Kcal/kg x 365 x 5/7 day x ¥ 10/kg = ¥ 59,800/year

Sub-total ¥ 95,400/year

4) Fuel Oil

Generators	10hr/mon x 12 mon/year x 250 KVA x 0.8 x 0.35L/KWH x ¥ 8/L = ¥ 67,200/year
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Boilers	50,000 Kcal/hr x 5hr/day/9,300 Kcal/L = 365 x 5/7day x ¥ 8/L = ¥ 56,100/year
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Autoclave	60,000 Kcal/hr, set x 2 set x 4hr/day/ 9,300 Kcal/L x 365 x 5/7 day x ¥ 8/L = ¥ 107,700/year
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Sub-total ¥ 231,000/year

5) Special Gas

Liquid CO ₂ gas	¥ 14.4/kg x 1,000 kg/year = ¥ 14,400
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Liquid N ₂ gas	¥ 35/kg x 100 kg/year = ¥ 3,500
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N ₂ gas	¥ 0.5/L x 2,000 L/year = ¥ 1,000
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He gas (imported)	¥ 1.6/L x 6,000 L/year = ¥ 9,600
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Ar gas	¥ 0.6/L x 6,000 L/year = ¥ 3,600
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H ₂ gas	¥ 0.35/L x 24,000 L/year = ¥ 8,400
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Sub-total ¥ 40,500

Grand Total (1) to 5)) ¥5,246,800/year

(3) Cleaning and Security Costs

This can be regarded as personnel expenses for workers required for cleaning and security guards.

1) Cleaning Workers	10 persons
¥ 2,000/mon x 10/persons x 12/mon	= ¥ 240,000/year
2) Security Guards	6 persons (around-the-clock system, 4 persons on duty all the time)
¥ 2,500/mon x 6 persons x 12 mon	= ¥ 180,000/year
Sub-total (1) and 2)	<u>¥ 420,000/year</u>

(4) Maintenance Cost for Facilities

1) Buildings

Maintenance, inspection and repair cost for buildings can be regarded as Repairing Expenses, which vary substantially depending on the age of buildings. For example, while repairing expenses for buildings are presumed to be about ¥ 3/m² annually until about 5 years after completion, they increase abruptly thereafter.

The following is the estimation at the rate of ¥60/m² for annual average expenses of a assumed life span of 30 years.

$$¥ 60/m^2/year \times 14,200 m^2 = ¥ 852,000/year$$

2) Utility Service Systems

As to the costs for inspection and maintenance of the utility service systems, there will be very few exchange of parts up to 5 years after the completion of facilities, but the next 5 years will necessitate a large number of exchanges of parts and the systems themselves. The average annual expenditure required for maintenance of systems, in a 10-year span, is approximately 5% of the total construction costs for utility service systems.

$$¥ 78,500,000 \times 5\%/year = ¥ 3,925,000/year$$

$$\text{Sub-total (1) and 2)) } \underline{¥ 4,777,000/year}$$

(5) Maintenance Costs for Research Equipment, etc.

1) Maintenance, inspection and repair costs for research equipment

Items	Costs per year for required parts	Costs per year for outside orders (trans- portation fee, fee for dispatched engineers)	Total
a. Experimental apparatus for general use	¥247,500	¥ 95,000	¥342,500
b. Analytical apparatus	¥ 27,500	¥190,000	¥217,500
c. Optical apparatus	¥ 33,000	¥ 95,000	¥128,000
d. Isolation, analytical apparatus	¥ 66,000	¥ 95,000	¥161,000
e. RI & biohazard experimental apparatus	¥ 82,500	¥ 95,000	¥177,500
f. Precision research apparatus	¥247,500	¥190,000	¥437,500
g. Sterilization apparatus	¥ 55,000	¥ 95,000	¥150,000
Sub-total	¥759,000/ year	¥855,000/ year	¥1,614,000/ year

2) Costs for Expendable Materials and Drugs for Research

Items	Costs Bahts/year
a) Glassware for experiments (general glassware for experiments, bottles for chemicals, etc., glass containers for culture medium, measuring instrument and concentration/ extraction apparatus made of glass, columns and absorbers for chromatograph)	฿ 2,550,000
b. Reagents for research	฿ 1,060,000
c. Culture medium for research	฿ 470,000
d. Antigens and antisera for research	฿ 265,000
e. RI reagents	฿ 495,000
f. Antiseptics and other chemicals	฿ 127,000
Sub-total	฿ 4,967,000/year

3) Costs for Operation and Maintenance of Animal Experiment Center

Items	Costs Bahts/year
a. Costs for purchasing animals	฿ 320,000
b. Costs for purchasing animal feed	฿ 60,000
c. Costs for supplementary materials	฿ 245,000
Sub-total	฿ 625,000
Grand total (1) to 3))	<u>฿ 7,206,000/year</u>

(6) Total Estimated Costs for Operation and Maintenance

1) Personnel Costs	¥ 21,360,000/year
2) Running Costs for Facilities	¥ 5,246,800/year
3) Cleaning/Guarding Costs	¥ 420,000/year
4) Maintenance Costs for Facilities	¥ 4,777,000/year
5) Maintenance Costs for Research Equipment, etc.	¥ 7,206,000/year

Grand total ¥ 39,009,800/year

CHAPTER 6: IMPLEMENTATION OF THE PROJECT

CHAPTER 6: IMPLEMENTATION OF THE PROJECT

6-1 ORGANIZATION

6-1-1 Client

As mentioned in 5-1-1 "Mode of Operation", DMS, Ministry of Public Health will act as the executing agency for the implementation of the Project.

Construction and Design Division of the Ministry will participate in the Project as a technical advisor to DMS in the technical matters. The Department of Technical and Economic Cooperation (DTEC), Office of the Prime Minister will assist the Client in the legal and administrative procedures necessary for the implementation of the Project within Thailand.

6-1-2 Consultant

A Japanese consultant shall be appointed by the Ministry and an agreement shall be concluded between the Ministry and the consultant in accordance with the guideline of Japanese Grant Aid Program, soon after the exchange of the Notes between two governments. A remuneration of the consultant shall be covered by the Grant.

The services to be rendered by the consultant shall be as follows:

(1) Working Design Stage

Preparation of working design documents consisting of drawings, specifications and other technical documents.

(2) Tendering Stage

The consultant shall take charge of tendering to select contractors for the execution of the Project and assist the Ministry to conclude the contract with the selected contractors.

(3) Construction Stage

The consultant shall, on behalf of the Ministry, administer the execution of the construction contract, the supply and installation of the equipment contract and supervise the works by way of dispatching architect(s) and engineer(s) to the Project site.

6-1-3 Contractor(s)

For the execution of the construction work and the supply and installation of the equipment, Japanese companies shall be selected through the tendering on the basis of the documents prepared by the consultant. A company who offered the lowest reasonable price shall be awarded the contract in accordance with the guideline of Japanese Grant-Aid Program. The contractors shall execute and complete their scope of work in compliance with the contract documents and hand their work over to the client at the end of the contract period.

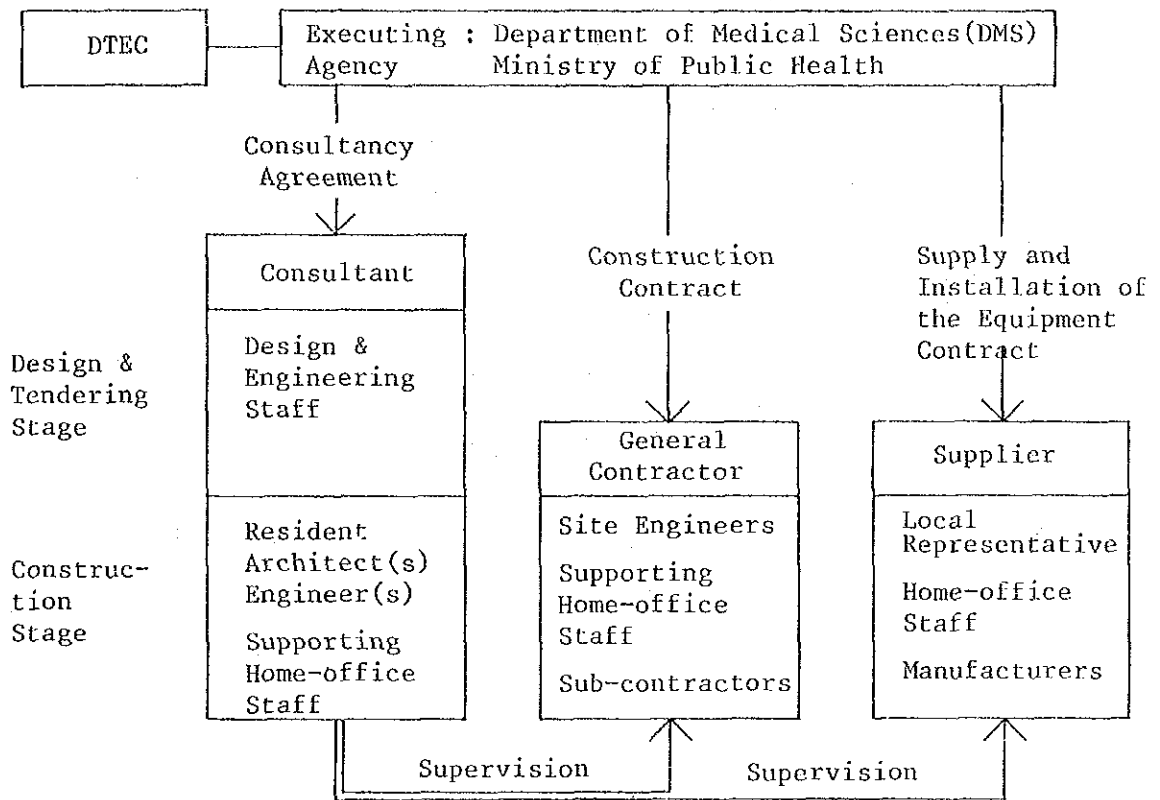


Fig. 6-1-3 Implementing Organization

6-2 CONSTRUCTION PROGRAM

6-1-1 Construction Plan

It is advantageous for the execution of the Project that all the construction works are to be undertaken at a single site which is located in the distance of thirty minute's drive from central Bangkok and convenient for transportation, communication, procurement of materials and recruiting of labour force.

The new NIH is composed of many number of small rooms of different function equipped with various building service systems and research equipment. There will be special facilities like biohazard laboratory, radioisotope laboratory, etc. Therefore a well organized construction program for good coordination of various works and trades involved in the Project is indispensable for the successful implementation of this relatively complicated construction project.

It is also important for the implementation of the Project that the works assigned to the Client such as landfilling and grading of the site, the construction of the access roads, lead-in of electricity, lead-in of telephone trunks and draw-in of city water are completed in line with the schedule of the construction.

As to the construction period for the Project, twenty two (22) months are estimated to be appropriate in due consideration of large floor area of approximately 14,200 m², complication of construction works and common building practice in Thailand.

6-2-2 Supervision Plan

In order to carry out the construction work satisfactory, good supervising and control of the progress and quality of the works are essential. A close coordination between the resident supervisors at the site and supporting staffs at home office in Japan is required for that. In the event that the construction work and the supply and installation of the equipment are carried out by different contractors under the separate contracts, a clear division of the scope of the works, careful adjustment of the work schedule between two and organization of communication network will become very important.

6-3 SCOPE OF WORK

According to the outline of the Grant-Aid Program of the Government of Japan, the scope of work to be covered by the Japanese side is the construction of the facilities and procurement of equipment for the NIH whereas the work to be covered by the Government of Thailand is to provide preparatory work for the Project site such as landfilling and grading, construction of Access Road and connection of infrastructures, and to operate and maintain the facilities and equipment after completion of the Project.

The scope of work to be conducted by each party have been specified in the Minutes of Discussion dated November 25, 1983 and approved by DMS, Ministry of Public Health. There are some items to be covered by the Government of Thailand simultaneously with, or prior to, the work by the Government of Japan, which are indispensable to a smooth implementation of the Project.

6-3-1 Works to be undertaken by the Government of Japan

(1) Construction of facilities for NIH

- 1) Research Laboratories
- 2) Scientific Equipment Center
- 3) Animal Experimental Center
- 4) Training and Administration
- 5) Others

(2) Procurement of equipment for NIH

- 1) Research Laboratories
- 2) Scientific Equipment Center
- 3) Animal Experiment Center
- 4) Training and Others

6-3-2 Works to be undertaken by the Government of Thailand

- (1) To carry out the Project Site preparation such as clearing, leveling and making access road before commencement of construction works.
- (2) To undertake incidental civil works such as gates, fencing, guard house, garage, gardening and exterior lighting if needed.
- (3) To construct the road outside the Project Site.

- (4) To provide facilities for distribution of electricity, water supply, drainage and telephone system as follows.
 - a. The distributing line of electricity to the Project Site.
 - b. The city water distribution main to the Project Site.
 - c. The drainage city main (for storm, sewer and others) to the Project Site.
 - d. The telephone trunk line to the main distribution frame/panel (MDF) of the building concerning of the Project.

- (5) To provide general furnitures such as table, chair curtain and others.

- (6) To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
 - a. Advising commission of Authorization to Pay
 - b. Payment Commission

- (7) To ensure unloading, customs clearance, bounded warehouse charge and tax exemption of the product at the port of disembarkation in Thailand.

- (8) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Thailand with respect to the supply of the products and services under the verified contracts.

- (9) To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into Thailand and stay therein for the performance of their work.
- (10) To bear all the expense other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.
- (11) To maintain and use properly and effectively the facilities constructed and equipment purchased under the Grant.
- (12) To provide counterparts both technical and administrative, in sufficient numbers and at appropriate levels.
- (13) To provide the space for a Site Office, Workshop, Warehouse and Courtyard for Building Materials which are necessary for the construction work.
- (14) To undertake incidental civil work for installing temporary electric power supply, water supply and telephone that are also necessary for the construction work.
- (15) To make it the responsibility of DMS to relocate the equipment currently used at DMS to the facilities of NIH after they are completed.

TENTATIVE OVERALL SCHEDULE

So that the construction period for the Project is estimated to be 22 months, the implementation of the Project shall be carried out in two phases in accordance with the procedure of Japanese Grant-Aid Program as indicated below. As shown in the schedule, the preparation works of Thai Government are to be executed in line with the overall schedule, prior to the commencement of the main construction work or during it.

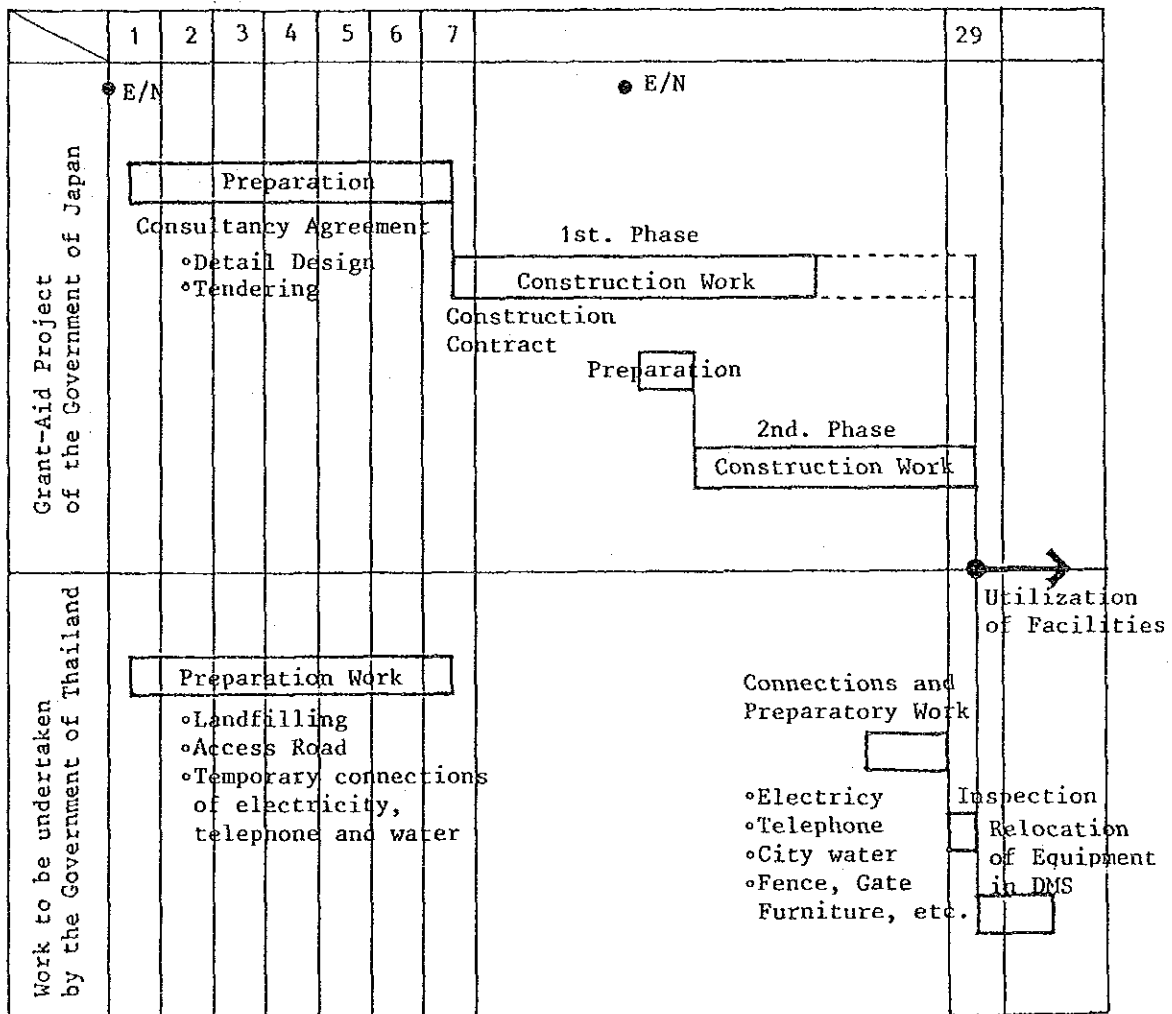


Fig. 6-4 Tentative Overall Schedule

CHAPTER 7: PROJECT APPRAISAL

CHAPTER 7: PROJECT APPRAISAL

The important point in the appraisal of the Project is whether the objectives and contents of the Project are appropriate for the Grant-Aid Project of the Government of Japan, and whether they fit into and meet the national and social needs in Thailand. It is also important whether the contents, size and grade of the facilities and equipment selected to attain the objectives of the Project are reasonably feasible with respect to the technics, operation, maintenance and budget, in view of the current circumstances in Thailand and whether, in the process of implementation of the Project, preparation of the Project site, preparatory works for infrastructure such as landfilling, grading and access roads are carried out without trouble. As the Project mainly aims at the reinforcement of research activities in medical sciences, it is very difficult to assess the merits and effects of the Project quantitatively, and therefore, the standard for Project appraisal has to be a qualitative one. The adequacy of the Project and effectiveness of cooperation shall therefore be appraised under the above-mentioned premises.

As stated in detail in Chapter 2, health conditions in Thailand are not satisfactory in the prevalence of various infectious diseases. Above all, diarrheal diseases, acute respiratory infections, dengue haemorrhagic fever, parasitoid diseases, malaria, and Japanese encephalitis, etc. are rampant, and as the poor health status of the inhabitants of rural areas, which account for 80% of the total population, is giving serious damage to agricultural production, the promotion of public health is still to be given

top priority in economic and social development. The reinforcement of infectious disease control and medical care was promoted as an important policy in the Fifth National Economic and Social Development Plan (1982-1986) and the importance of health research activities in public health administration based on scientific grounds was recognized. The adequacy of the Project is therefore evident, from the viewpoint that the establishment of the National Institute of Health forms a link in the chain of those higher programs.

The Team made investigations on the present circumstances in Thailand of health, medical services and public health status as well as the research activities and research organizations thereof to find out what kind of activities are actually required for the Project. As a result, it was projected that researches to be carried out at NIH should be mainly focused on basic researches on infectious diseases, and on the future development in the area of health research directly involved with improving the health of people. The national center for the research in medical sciences will be realized with the establishment of NIH which promotes the reinforcement of basic research on public health.

One other important point of the Project is how the results of the research activities of high grade in central institution can be extended throughout Thailand to assist the health promotion in rural areas. In this respect, the Promotion of Provincial Health Services Project promoted since 1976 through the technical cooperation of JICA, and collaboration among six Regional Medical Sciences Centers in Songkhla, Nakhon Ratchasima, Khon Kaen,

Phittsanulok, Chon-Buri and Chiang Mai under the direct supervision of DMS have a significant importance.

As a result of examination and study on the contents and appropriate size of the facilities for the Project, the total floor area is set to be approximately 14,200 m². It is much smaller than that originally requested, however, the projected facilities are considered to be appropriate with effective use of the space by way of introduction of common-use laboratories, facilities and equipment. It is considered to be appropriate in terms of operation and maintenance as well. Existing research equipment owned by DMS are to be utilized as much as possible in the new NIH.

The Project, aiming at technical improvement of the higher and basic research in medical sciences, is expected to further develop the research in this field in Thailand by upgrading the technical standard at rural area, leading to developments in formulating firm foundations for improvement of the health and physical strength of the people in Thailand and ultimately contributing to the development of the nation itself.

With intensive as well as extensive development in future, the NIH will newly function as an international reference center for ASEAN countries and other countries in South-East Asia, similarly plagued with miscellaneous diseases, and will play an active part in the prevention and treatment of such diseases.

CHAPTER 8: TECHNICAL COOPERATION

CHAPTER 8: TECHNICAL COOPERATION

Technical cooperation, particularly in the field of public health, is very important to Thailand today. Many foreign countries and international organizations such as WHO have been offering assistance in this area. The Government of Japan has been making substantial contribution in this area by technical cooperation through the Japan International Cooperation Agency. Such technical cooperations include the Virus Research Institute (1961-1966) for research of various viral diseases, Medicinal Plant Research Project (1967-1973) for research and development of crude drugs, National Cancer Institute Project (1967-1981) for early diagnosis of cancer and upgrading of the level of treatment and Family Planning Project (1974-1979), and so on. In particular, the "Promotion of Provincial Health Services Project" executed since 1976 has brought about many fruitful results by establishing effective means of promoting public health activities, disease control, reinforcing health research activities and surveillance system in rural areas. In the model areas of Chanthaburi and Chon-Buri region, the Government of Thailand launched the project to foster systematic research in public health for effective prevention and treatment of diseases. As a result of such research, establishment of a central organization which conducts advanced researches and expands its research results to rural areas was recognized to be indispensable and effective.

It goes without saying that Thai researchers trained abroad point at the high level of technical knowledge, but the numbers of such researchers are limited.

Therefore, it is of vital significance to extend technical cooperation to implement the Project successfully through means of directing fundamental technical guidance and introducing high-level technique, and, after all, to level up a whole research standards for the accumulation and propagation of specialized technical knowledge and skills.

In this context, the proposed technical cooperation for the Project shall be, generally speaking, focused on the designated field of diseases, which will enable us to achieve the ear-marked, effective aids. It would be recommendable for the Government of Thailand to concentrate to the fields of infectious diseases since the Project puts on the basic research regarding the prevention and control against the diseases.

CHAPTER 9: CONCLUSION AND SUGGESTIONS

CHAPTER 9: CONCLUSION AND SUGGESTIONS

The preamble to the WHO Charter (1948) defines the word "health" to be "the condition where one is in perfectly fine state, in physical, mental and social aspects, and not to be "the conditions merely without illness and physical weakness". However, in the present circumstances in Thailand, it will be necessary to take much more efforts to create the condition of "merely without illness and physical weakness", compelling the Government of Thailand to promote the "National Health Development Plan" and to grapple earnestly with the problems of prevention of diseases and improvement of health, designated to be nationally significant.

The Project for the establishment of the National Institute of Health aims at promoting basic research activities on health science, contributing particularly to the control and treatment of infectious diseases and other national important diseases. The result of research in this institute will contribute greatly to the improvement of health status of Thai people. The Government of Thailand has been expecting Japanese Government to cooperate this Project by grant-aid and technical cooperation.

Through the basic design study, the Team investigated the background, objectives of the Project and status of preparation for research activities, operation and maintenance. The Team also confirmed the preparatory efforts for the execution of the Project made by Thai Government. The Team concluded that this Project possessed sufficient adequacy for the Government of Japan to execute as its Grant-Aid Project, and that its cooperation

efforts will contribute to the improvement of health of the people in Thailand and, ultimately, to the friendly relationship between Japan and Thailand. It is earnestly wished that the Government of Japan will take a strong action to promote the cooperation to this Project.

Finally, the Team presents the following suggestions to the party concerned in Thailand that, in the event of the implementation of the Project, the facilities and equipment may function as intended and that good results may be obtained from research activities.

While structural reformation and reorganization of the existing DMS is expected to be promoted by the party concerned in Thailand, it is essential to put the organization in order by defining clearly the scope of cooperation and share of responsibility with other divisions in DMS, etc. so that the institute may be operated effectively.

It deems to be necessary for the Government of Thailand to give sufficient consideration for secure financial supports such as operation and maintenance costs for facilities and equipment. Out of basic recognition that the essence of research is talented staff, it is expected that the Government of Thailand would try constantly to reinforce the manpower.

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(1) Basic Design Study Team (Basic Design Study, Nov.-Dec. 1983)

1) Member List

THE JAPANESE BASIC DESIGN STUDY TEAM

FOR

THE NATIONAL INSTITUTE OF HEALTH

MEMBER LIST

Team Leader	Dr. Ryosuke Murata	Honorary Member of the National Institute of Health
Public Health	Dr. Konosuke Fukai	Honorary Professor, Research Institute for Microbial Diseases, Osaka University
Project Coordinator	Mr. Katsuji Onoda	Basic Design Div. Grant Aid Dept., JICA
Chief Architect	Mr. Masami Tanaka	Nikken Sekkei Ltd.
Architect	Mr. Hideharu Hisano	Nikken Sekkei Ltd.
Electrical Engineer	Mr. Hiroshi Yoshimiya	Nikken Sekkei Ltd.
Mechanical Engineer	Mr. Koichi Masuda	Nikken Sekkei Ltd.
Research Equipment	Mr. Kyoichi Izawa	Nikken Seekei Ltd.

2) Itineray

1983

- Nov. 15 (Tue) Arrive in Bangkok
Confirmation of schedule
- Nov. 16 (Wed) Meeting with the Embassy of Japan and JICA
Courtesy visit to DETEC.
Meeting with Dr. Nadhirat Sangkawibha, Director General of DMS, to present the Inception Report and explain the details and schedule of the Basic Design Study.
- Nov. 17 (Thur) First meeting with DMS, to give an account of the objectives and methods of the studies specified in the Inception Report, explain about the Grant-Aid Program, and request for provision of materials necessary for the studies, etc.
On-the-site survey (initial study).
- Nov. 18 (Fri) Courtesy visit to Dr. Amorn Nondasuta, Permanent Secretary of the Ministry of Public Health.
Hearing session on the background of the Project, planned activities of the new NIH and relations with DMS, and connection with the Primary Health Care Program and the Promotion of Provincial Health Services Project.

Nov. 19 (Sat) Meeting within the Team to review the subjects of the hearing session.

Nov. 20 (Sun) Meeting within the Team to review the acquired materials make preliminary studies on the subjects to be discussed at the meetings to follow.

Nov. 21 (Mon) 3rd meeting with DMS.
Hearing session on the activities of each research unit at NIH, exchange of views, etc.

Nov. 22 (Tue) 4th meeting with DMS.
Hearing session on the activities of each research unit at NIH, exchange of views, and consultation on the size of the facilities.
Meeting within the Team

Nov. 23 (Wed) 5th meeting with DMS.
Discussions on the major targets of the activities of NIH, and the fields which require technical cooperation. Consultation on the size of the facilities.
Meeting and work within the Team (on research equipment)

Nov. 24 (Thur) 6th meeting with DMS.
Compiling the Minutes of Discussion, consultation on the size of the facilities and allocation of floor area to each research unit.

- Nov. 25 (Fri) Signing and exchanging of the Minutes of Discussion.
Observation of the existing facilities.
- Nov. 26 (Sat) Study on Chon-Buri Regional Health Laboratory.
- Nov. 27 (Sun) Study on Chanthaburi Provincial Laboratory.
- Nov. 28 (Mon) Report to the Embassy of Japan, JICA and DTEC.
Observation on the National Laboratory Animal Center of Mahidol University, arrangement with the Metropolitan Water Work Authority (M.W.W.A) for supplying water to the facilities.
- Nov. 29 (Tue) Team Leader Murata, Team Member Fukai and Project Coordinator Onoda return to Japan.
7th meeting with DMS.
Discussions on the access road, landfilling of the Project site, Master Plan concept, boring study of the Project site, size and utilities for the standard research experiment room, and water supply, electricity and sewerage systems.
Discussions with the Environmental Health Division for setting up a standard for waste water.
Arrangement with the Metropolitan Electricity Authority (M.E.A.) for supplying electricity to the facilities.
- Nov. 30 (Wed) 8th meeting with DMS on the rooms, utilities and equipment required for each research unit.
Observation on the existing facilities.

- Dec. (Thur) 9th meeting with DMS on the rooms, utilities and equipment required for each research unit.
- Dec. 2 (Fri) Study on the existing Biological Products Control Laboratory (within G.P.O.).
10th meeting with DMS, on the rooms, utilities and equipment required for each research unit.
- Dec. 3 (Sat) Team Member Izawa returns to Japan.
Survey on Project site and access road (2nd study).
- Dec. 4 (Sun) Work within the Team for putting in order the subjects discussed at the previous meetings.
- Dec. 5 (Mon) Work within the Team for putting in order the subjects discussed at the previous meetings.
- Dec. 6 (Tue) 11th meeting with DMS.
Confirmation on the subjects of consultation.
Report to the Embassy of Japan and JICA.
- Dec. 7 (Wed) Team Members Tanaka, Hisano, Yoshimiya and Masuda return to Japan.

3) Minutes of Discussion



MINUTES OF DISCUSSION
ON
THE ESTABLISHMENT PROJECT OF THE NATIONAL INSTITUTE OF HEALTH
IN THE KINGDOM OF THAILAND
BETWEEN
THE JAPANESE BASIC DESIGN SURVEY TEAM
AND
THE AUTHORITIES CONCERNED OF THE ROYAL GOVERNMENT OF THAILAND

In response to the request made by the Royal Government of Thailand for a grant aid of the Establishment Project of the National Institute of Health in Thailand (hereinafter referred to as "The Project"), the Government of Japan, through Japan International Cooperation Agency (JICA), has dispatched a survey team headed by Dr. Ryosuke MURATA, Honorary Member of the National Institute of Health in Japan (hereinafter referred to as "The Team") to conduct the basic design study on the Project from November 15 to December 7, 1983.

The Team has carried out a field survey, had a series of discussions and exchanged views with the Thai authorities concerned of the Project.

As a result of the survey and discussions, the Team and the Thai authorities concerned have agreed to recommend to their respective Governments that the results of the discussions attached herewith should be examined toward the realization of the Project.

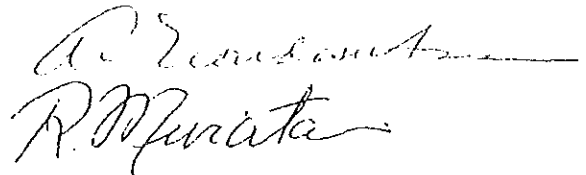
Bangkok, November 25, 1983

Dr. Ryosuke MURATA
Team Leader
Japanese Survey Team

Dr. Amorn NONDASUTA
Permanent Secretary
Ministry of Public Health
The Royal Government of Thailand

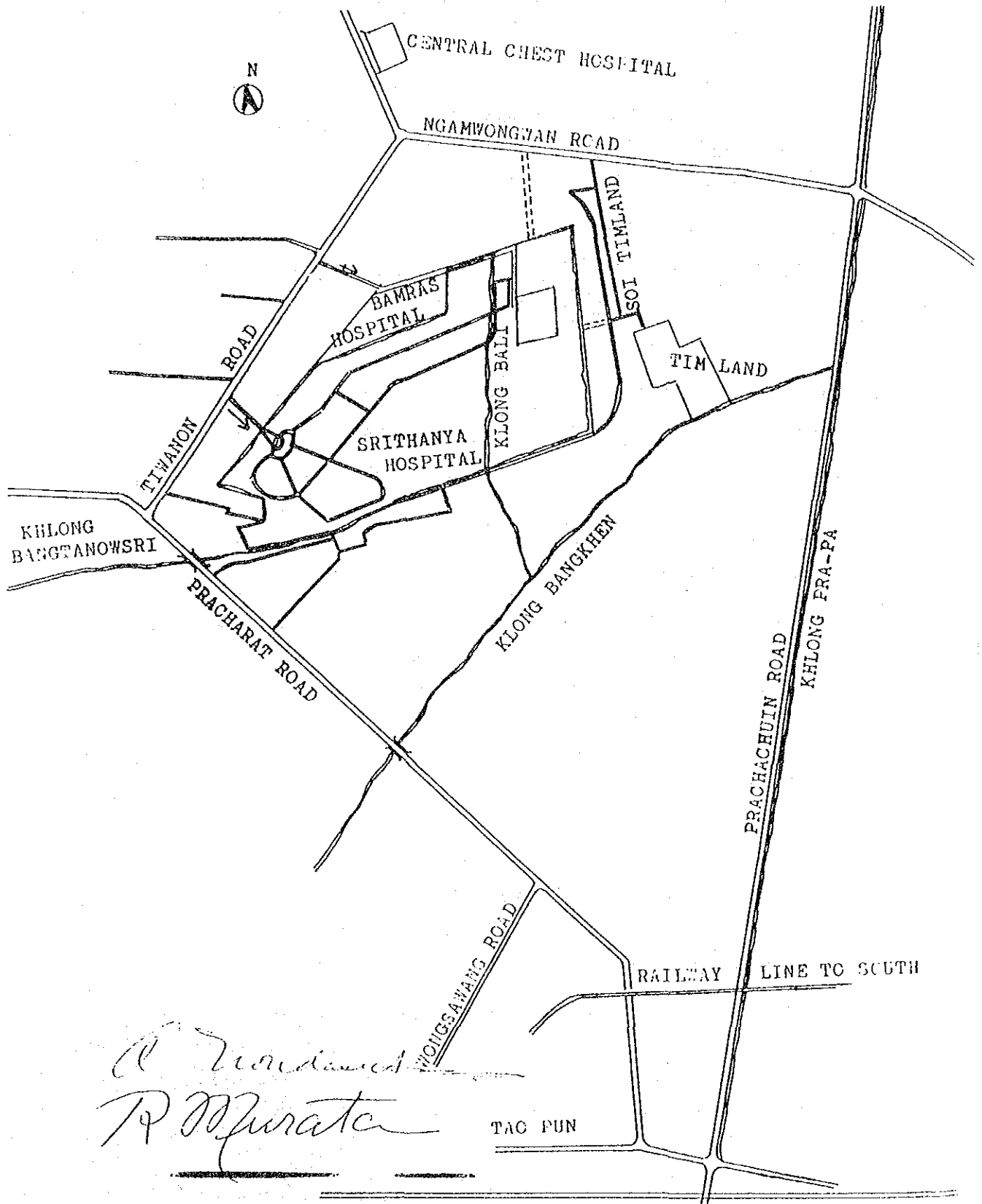
ATTACHMENT

1. The objective of the Project is to provide necessary buildings, facilities and equipment for establishment of the National Institute of Health in Thailand (hereinafter referred to as "the NIH").
2. The proposed site of the Project under the authority of the Thai Ministry of Public Health is located at the area of Sri-thanya Mental Hospital, Tiwanon Road, Nonthaburi Province as attached in Annex I, II.
3. NIH is a new research organization in the Department of Medical Sciences, Ministry of Public Health, responsible for research in national important health problems.
4. Activities of NIH are shown in Annex III
5. The implementation body of the Project in Thai side is the Department of Medical Sciences, Ministry of Public Health.
6. The Team will convey the need of the Royal Government of Thailand to the Government of Japan that the technical cooperation programme is needed to be implemented in view of more effective and smooth operation.
7. The Team will convey the desire of the Royal Government of Thailand to the Government of Japan that the Japanese Government will take necessary measures to cooperate in implementing the Project by extending grant aid for construction of buildings and other items as listed in Annex IV, with priority within the scope of Japan's Economic Cooperation Programme in grant form.
8. The Thai authorities concerned have understood and confirmed Japan's Grant Aid system explained by the Team which includes a principle of use of a Japanese consultant firm and a Japanese general contractor for implementation of the Project.
9. The Thai authorities concerned have confirmed the Royal Government of Thailand will take necessary measures as listed in Annex V on condition that grant aid by the Government of Japan is extended to the Project.


R. Murata

Annex I

SITE FOR NIH, DEPARTMENT OF MEDICAL SCIENCES
MINISTRY OF PUBLIC HEALTH

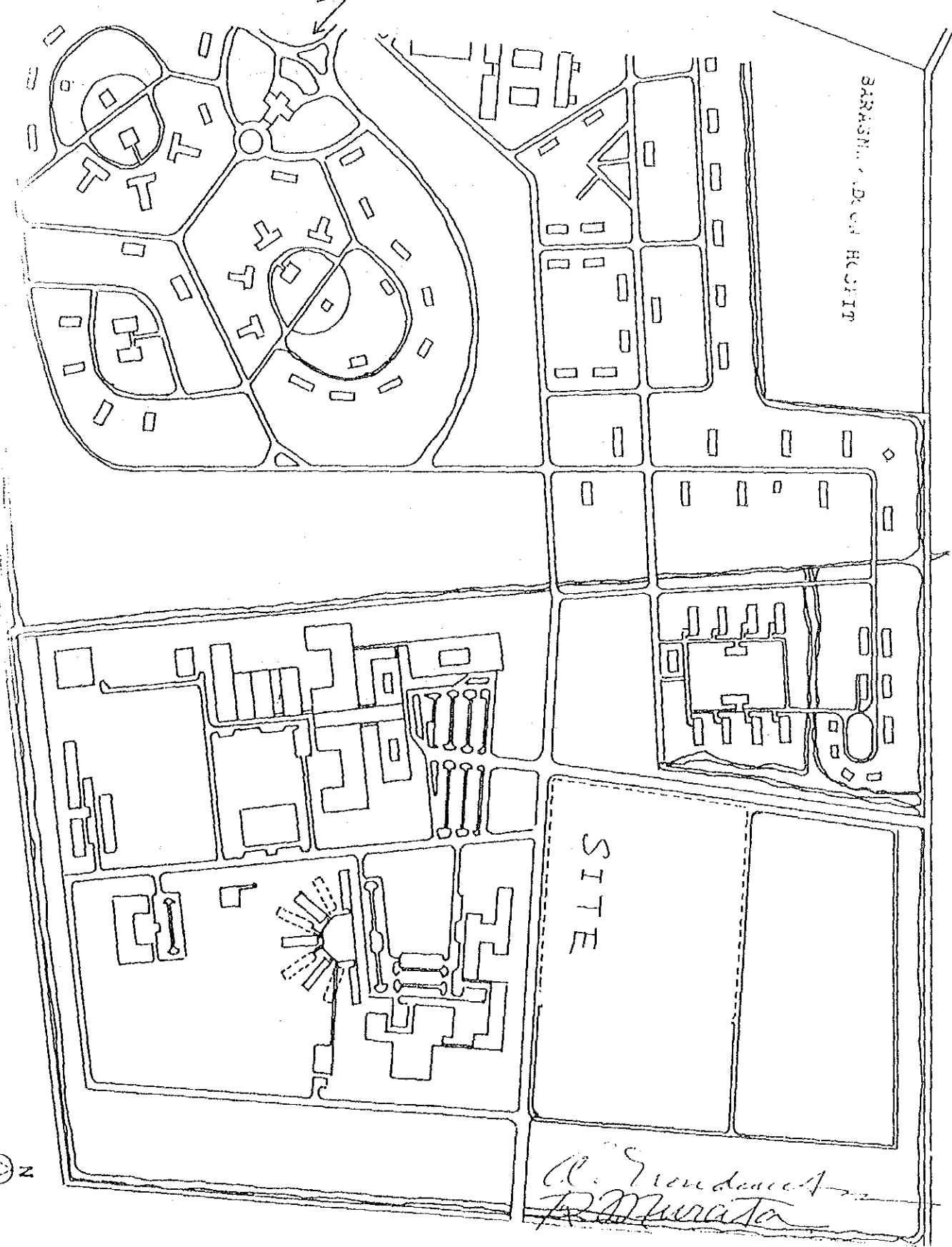


TC
SRITHANVA
HOSPITAL

BARASHN. DR. CH. HOSPITAL

SITE

A. Soudan
R. Murata



Annex III

The priority of the NIH's activities are as follows :-

Virology
Bacteriology
Mycology
Parasitology
Immunology
Biological Products Control
Medical Entomology
Medicinal Plant Research
Environmental Chemistry
Biomedical Research in Food
Pharmaceutical Science

R. Murata

11. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant.
12. To provide counter-parts both technical and administrative, in sufficient numbers and at appropriate levels.

A. Sundaram
R. Murata

(2) Basic Design Study Team (Confirmation, Feb.-Mar. 1984)

1) Member List

THE JAPANESE BASIC DESIGN STUDY TEAM
FOR
THE NATIONAL INSTITUTE OF HEALTH PROJECT

MEMBER LIST

Team Leader	Dr. Ryosuke Murata	Honorary Member of the National Institute of Health
Public Health	Dr. Konosuke Fukai	Honorary Professor, Research Institute for Microbial Diseases, Osaka University
Project Coordinator	Mr. Katsuji Onoda	Basic Design Div. Grant Aid Dept., JICA
Chief Architect	Mr. Masami Tanaka	Nikken Sekkei Ltd.
Architect	Mr. Hideharu Hisano	Nikken Sekkei Ltd.
Research Equipment	Mr. Kyoichi Izawa	Nikken Sekkei Ltd.

2) Itinerary

1984

- Feb. 27 (Mon) Team Members Tanaka, Hisano and Izawa arrive in Bangkok.
- Feb. 28 (Tue) Preliminary explanation to DMS (participated by Team Member Fukai)
- Feb. 29 (Wed) Preliminary explanation to, and consultation with, DMS and the Division of Construction & Design.
Team Leader Murata and Project Coordinator Onoda arrive in Bangkok.
- March 1 (thur) Visit to the Embassy of Japan and JICA, to make reports and hold discussions.
Explanation to, and discussions with, DMS on the draft of the final report.
- March 2 (Fri) Explanations and discussions with DMS on the draft of the final report.
- March 3 (Sat) Meeting within the Team.
- March 4 (Sun) Work within the Team.
- March 5 (Mon) Meeting with DMS.
Signing of the Minutes of Discussions in the afternoon.

March 6 (Tue)

Report to DTEC

Discussion on the technical details with the Division
of Construction & Design.

March 7 (Wed)

The Team returns to Japan.

3) Minutes of Discussions

MINUTES OF DISCUSSIONS

The Draft Report of the Basic Design Study on the Establishment Project of the National Institute of Health in the Kingdom of Thailand

At the request of the Government of the Kingdom of Thailand for grant aid for the Establishment Project of the National Institute of Health, the Government of Japan dispatched a Mission to carry out the Basic Design Study (hereinafter referred to as "the Study") on the Establishment Project of the National Institute of Health (hereinafter referred to as "the Project") through Japan International Cooperation Agency (JICA) from November 15th to December 7th, 1983.


The Mission carried out a field survey and had a series of discussions with the authorities concerned of the Government of the Kingdom of Thailand.

As a result of these survey and discussions, JICA prepared and submitted a Draft Final Report on the Study (hereinafter referred to as "the Report") and dispatched a Mission to explain and discuss on the Report starting from February 28th to March 7th, 1984.

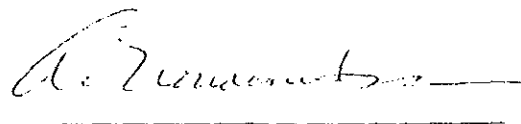
Both parties had a series of discussions on the Report and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined toward the realization of the Project.

March 5th, 1984

Bangkok



Dr. Ryosuke MURATA
Leader of Japanese Survey
Team



Dr. Amorn NONDASITA
Permanent Secretary
Ministry of Public Health
The Government of the Kingdom
of Thailand

MAJOR POINT OF UNDERSTANDING

BASIC DESIGN

1. The Thai side principally has agreed to the basic design proposed in Draft Final Report.
2. The Final Report (10 copies in English) on the Project will be submitted to the Thai side by the end of April 1984.
3. Major undertakings to be taken by both Governments for the implementation of the Project are shown in Annex I.

ANNEX I

Major undertakings to be taken by both Governments

		Japanese side	Thai side
1.	To secure a lot of land		0
2.	To clear, level and reclaim the site when needed		0
3.	To construct the gate and fence in and around the site		0
4.	To construct the parking lot	0	
5.	To develop the landscape in the site		0
6.	To construct the road		
	1) Within the site	0	
	2) Outside the site		0
7.	To construct the building	0	
8.	To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. Distributing line to the site		0
	b. Drop wiring and internal wiring within the site	0	
	c. Main circuit breaker	0	
	d. Transformer		0

	Japanese side	Thai side
2) Water Supply		
a. City water distribution main to the site		0
b. Supply system within the site (receiving and elevate tanks)	0	
3) Drainage		
a. Drainage city main (for storm, sewer and others) to the site		0
b. Drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	0	
4) Telephone System		
a. Telephone trunk line to the main distribution frame/panel (MDF) of the building		0
b. MDF and the extension after the frame/panel	0	
5) Furniture and Equipment		
a. Furniture for general office		0
b. Project equipment and furniture for research and training	0	

		Japanese side	Thai side
9.	To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A		
	1) Advising commission of A/P		0
	2) Payment commission		0
10	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	0	
	2) Tax exemption and customs clearance of the products at the port of disembarkation		0
	3) Internal transportation from the port of disembarkation to the project site	0	
11	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such necessities as may be required for their entry into recipient country and stay therein for the performance of their work		0
12	To maintain and use properly and effectively that the facilities constructed and equipment purchased under the Grant		0
13	To bear all the expenses other than those to be borne by the Grant		0

(3) Thai Government Officials Concerned

1) DEPARTMENT OF TECHNICAL & ECONOMIC COOPERATION (DTEC)

Mr. Kasem Unahasuvan	Deputy Director General
Mr. Pracha Chaowasilp	Director, Division II of External Cooperation
Mr. Sutin Susila	Colombo Plan Sub-Division
Mr. Surayuth Kungsadan	Colombo Plan Sub-Division

2) DEPARTMENT OF MEDICAL SCIENCES (DMS), MINISTRY OF PUBLIC HEALTH

Dr. Nadhirat Sangkawibha	Director General
Dr. Preeya Kashemsant	Deputy Director General
Dr. Panchitta Ekachampaka	Deputy Director General
Miss Panida Kanchanapee	Director, Division of Medical Research
Dr. Boonluan Phanthumachinda	Director, Division of Medical Entomology
Dr. Kanai Chatiyononda	Director, Virus Research Institute
Mr. Alan Idsavas	Director, Division of Toxicology

Dr. M.L. Ratanasuda Phanurai	Director, Division of Clinical Pathology
Dr. Chaweewon Halilaminan	Director, Division of Food Analysis
Miss Boonlarp Kitisiin	Director, Division of Drug Analysis
Miss Amnueyphorn Tantivejakul	Director, Office of Secretary
Dr. Somkiat Wangkobkiat	chief Scientist, Scientific Instrument Center
Mr. Smarn Pongpairroj	Senior Scientist, Biological Products Control
Dr. Nongluck Asawachinda	Senior Scientist, Virus Research Institute
Mrs. Boosun Suntainun	Senior Scientist, Div. of Food Analysis
Miss Amara Vongputiak	Senior Scientist, Div. of Food Analysis
Dr. Nuanta Muangnoicharoen	senior Scientist, Div. of Drug Analysis
Mrs. Sangthong Sawasdiphab	Senior Scientist, Div. of Drug Analysis
Miss Wiyada Charoensiriwatana	Scientist, Div. of Drug Analysis
Dr. Paiboon Sa-Ngobwarcha	Director, Div. of Radiation Protection Services
Dr. Tutchai Mungskandee	Principal Medical Officer, Office of Permanent Secretary

3) DIVISION OF CONSTRUCTION & DESIGN, MINISTRY OF PUBLIC HEALTH

Mrs. Kaisri Tunsiri	Director
Mr. Kriang Eksuwan	Architect
Mr. Wicha Sutasininond	Structural Engineer
Mr. Somsak Rungrojwanich	Electrical Engineer
Mr. Surasak Sirivoravith	Sanitary Engineer

4) OTHERS

Dr. Pradon Chatikavanij	Director, National Laboratory Animal Center, Mahidol University
Dr. Megumi Hasegawa	Team Leader, JICA Experts
Mr. Takeo Miyazaki	JICA Expert
Mr. Osamu Yasuda	JICA Expert in Economic Planning National Economic and Social Development Board (NESDB)

(4) Thai Authorities Concerning Utility Services

1) Electric Power Supply

Metropolitan Electricity Authority (M.E.A.)

2) Telephone

Telephone Authority of Thailand (T.A.T.)

3) Water Supply

Metropolitan Water Work Authority (M.W.W.A.)

4) Sewerage

Environmental Health Div., Health Dept., Ministry of
Public Health

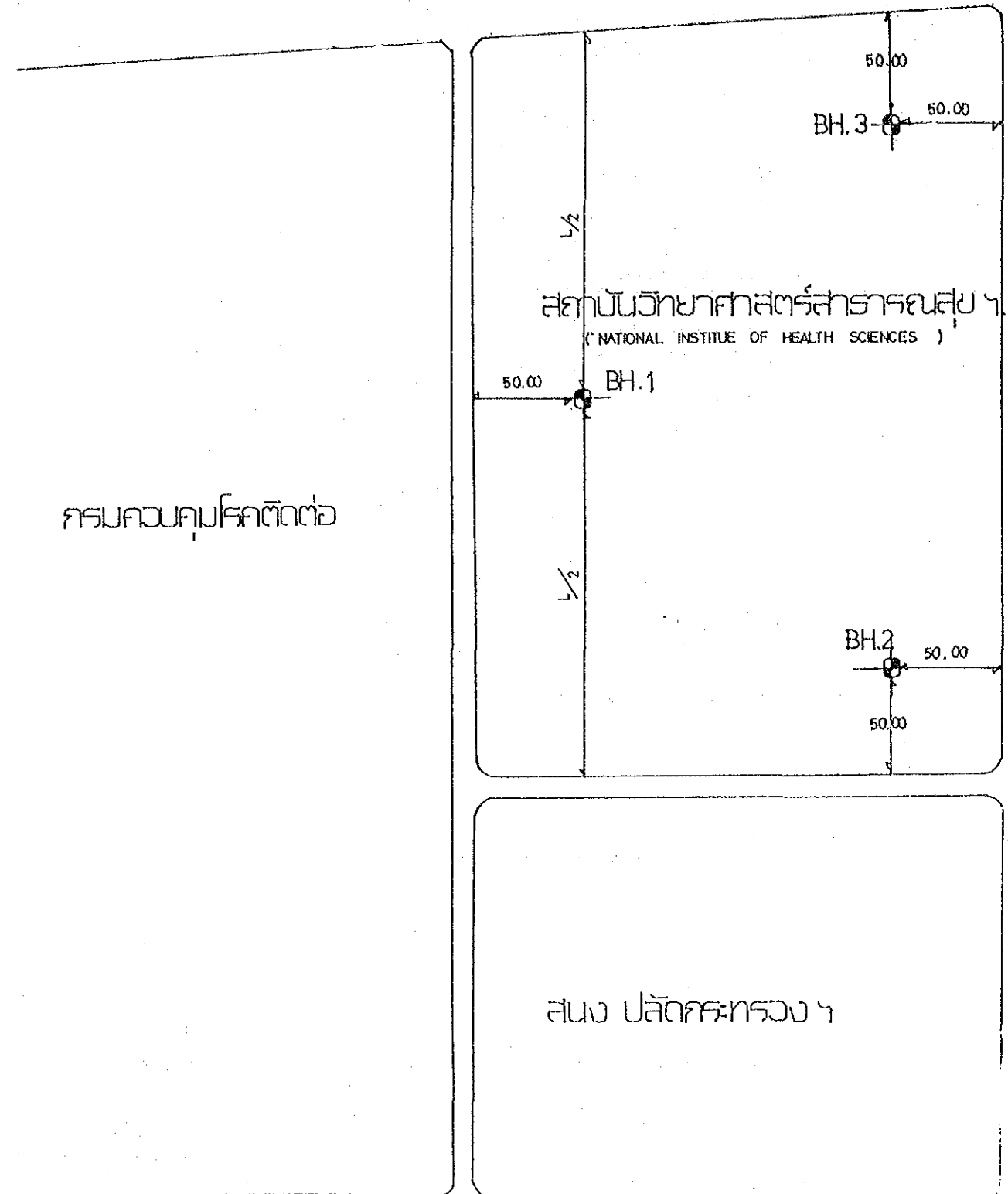
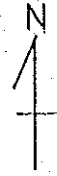
5) Garbage Disposal

Garbage Disposal Div., The Bangkok Metropolitan Administration
(B.M.A.)

6) Radioisotope

Waste Disposal Div., Office of the Atomic Energy for Peace

(5) Boring Data of the Project Site



BORING LOCATION
NATIONAL INSTITUTE OF HEALTH SCIENCES.
NONTHABURI.

กรมศิลปากร มหาวิทยาลัยเกษตรศาสตร์

FIG. 3

GROUND WATER OBSERVATION.				W.E.C. BORING LOG	BORING NO. 1
DATE	TIME	EL. of HOLE	EL. of WATER		SURFACE ELV.
24-HR. AFTER BORING.				LOCATION. อุบลราชธานี	DATE START 27.1.27
					DATE FINISH 30.1.27

SOILS DESCRIPTION	SOIL PROFILE	SAMPLE TYPE NO.	DEPTH, M.	STANDARD - PENETRATION.	LIQUID LIMIT.				One half Unconfined Compressive Strength.			TOTAL DENSITY, γ_d, γ_w T/M ³	
				BLOWS/FT.	Q- PLASTIC LIMIT.		NATURAL MOISTURE CONTENT.		NSMU WANE SHEAR	One half Pocket - Penetrometer Rdg.	SENSITIVITY		
					%		%						KSC.
GROUND LEVEL			0.00	30	20	40	60	80	1	2	3	1	2
TOP SOILS	1.00												
VERY SOFT DARK GREY SILTY CLAY, OCCASIONAL VERY FINE SAND, DECAYED WOOD, SHELL BITS		ST.1											
		ST.2											
		ST.3											
		ST.4											
		ST.5											
		ST.6											
		ST.7											
		ST.8											
		ST.9											
		ST.10		10									
		ST.11											
		ST.12											
		ST.13											
		ST.14											
	ST.15		15.25										
VERY STIFF GREY & BROWN FINE SANDY CLAY.	16.30	SS.16		92									
		SS.17		95									
VERY DENSE TO DENSE BROWN SILTY VERY FINE SAND.		SS.18		97									
		SS.19		49									
		SS.20	20	54									
		SS.21		39	66								
		SS.22	22.50	49									
		SS.23		62									
DENSE TO VERY DENSE SILTY VERY FINE SAND.		SS.24		100									
		SS.25		94									
		SS.26		83									
		SS.27		91									
		SS.28		95									
		SS.29		95									
		SS.30	30.45	96									
END OF BORING			30										

รายงาน สถาบันวิทยาศาสตร์สาธารณสุข

FIG. 4

GROUND WATER OBSERVATION.				W.E.C. BORING LOG				BORING NO. 2					
DATE	TIME	EL. OF HOLE	EL. OF WATER	LOCATION. อุบลราชธานี				SURFACE ELV.					
								DATE START 30. 1. 27					
24 HR. AFTER BORING.		FLOOD M.		SOILS DESCRIPTION...				DATE FINISH 2. 2. 27					
SOIL PROFILE		SAMPLE TYPE NO. ...						DEPTH, M.		STANDARD - PENETRATION.		LIQUID LIMIT.	
						BLOWS / FT.		PLASTIC LIMIT.		INSITU VANE SHEAR...			
								NATURAL MOISTURE CONTENT.		One half Pocket Penetrometer Rdg.			
								%		SENSITIVITY			
										KSC.			
GROUND LEVEL				0.00		30 60		20 40 60 80		1 2 3			
TOP SOILS 1.00										1 2			
VERY SOFT DARK GREY SILTY CLAY, OCCASIONAL DECAYED WOOD, SHELL BITS & VERY FINE SAND.				ST. 1									
				ST. 2									
				ST. 3									
				ST. 4									
				ST. 5									
				ST. 6									
				ST. 7									
				ST. 8									
				ST. 9									
				ST. 10									
				ST. 11									
				ST. 12									
				ST. 13	13.30								
VERY STIFF LI-GREYISH BROWN SILTY CLAY.				ST. 14									
				SS. 15	15.50								
MEDIUM TO VERY DENSE - BROWN & GREYISH BROWN SILTY FINE - SAND				SS. 16		20							
				SS. 17		23							
				SS. 18			55						
				SS. 19			46						
				SS. 20		20	39						
				SS. 21			39						
				SS. 22			47						
				SS. 23	24.00		61						
				SS. 24			65						
				SS. 25			116						
VERY DENSE GREY SILTY FINE - SAND.				SS. 26			74						
				SS. 27				70					
				SS. 28			59						
				SS. 29			60						
				SS. 30	30.45		65						
END OF BORING													

ฉากร... สภามณฑลนครราชสีมา

FIG. 5

GROUND WATER OBSERVATION.				W.E.C. BORING LOG.		BORING NO. 3	
DATE	TIME	EL. of HOLE	EL. of WATER	LOCATION. อุบลราชธานี		SURFACE ELV.	
24 HR. AFTER BORING.			FLOOD -M			DATE START 2. 2 .27	DATE FINISH 5. 2 .27

SOILS DESCRIPTION...	SOIL PROFILE	SAMPLE TYPE NO. ...	DEPTH, M.	STANDARD - PENETRATION.	LIQUID LIMIT.				One half Unconfined Compressive Strength.			TOTAL DENSITY.		
					PLASTIC LIMIT.				INSITU VANE SHEAR...					
				BLOWS / FT.	NATURAL MOISTURE CONTENT.				One half Pocket Penetrometer Rdg.			$\frac{\gamma_d \cdot \gamma_w}{\gamma_m}$ T/M ³		
					%				KSC.					
GROUND LEVEL			0.00	30 - 60	20	40	60	80	1	2	3	1	2	
TOP SOILS	1.20													
VERY SOFT DARK GREY SILTY CLAY, OCCASIONAL SHELL BITS, VERY FINE SAND, DECAYED WOOD	ST. 1													
	ST. 2													
	ST. 3													
	ST. 4													
	ST. 5													
	ST. 6													
	ST. 7													
	ST. 8													
	ST. 9													
	ST. 10			10										
	ST. 11													
	ST. 12													
	13.50	ST. 13												
VERY STIFF GREYISH BROWN SILTY CLAY	15.00	ST. 14												
STIFF GREYISH BROWN VERY FINE SANDY CLAY	16.05	SS. 15		20										
MEDIUM TO VERY DENSE BROWN SILTY FINE SAND.	SS. 16			24										
	SS. 17			34										
	SS. 18			46										
	SS. 19			49										
	SS. 20		20	91										
	SS. 21			66										
	SS. 22			66										
	SS. 23		24.00	57										
	SS. 24			62										
	SS. 25			18										
MEDIUM TO VERY DENSE GREY & GREYISH BROWN SILTY FINE SAND, OCCASIONAL GRAVEL.	SS. 26			39										
	SS. 27			41										
	SS. 28			35										
	SS. 29			32										
	SS. 30		30.45	31										
END OF BORING			30											

JICA