

No.

**Preliminary Design
for
The National Agricultural Extension
and Training Service Center
and
The Agricultural Machinery and Equipment Center
of
Kasetsart University Kamphaengsaen Campus
in the Kingdom of Thailand**

MARCH 1979

JAPAN INTERNATIONAL COOPERATION AGENCY

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COURTESY VISITS TO DTEC.

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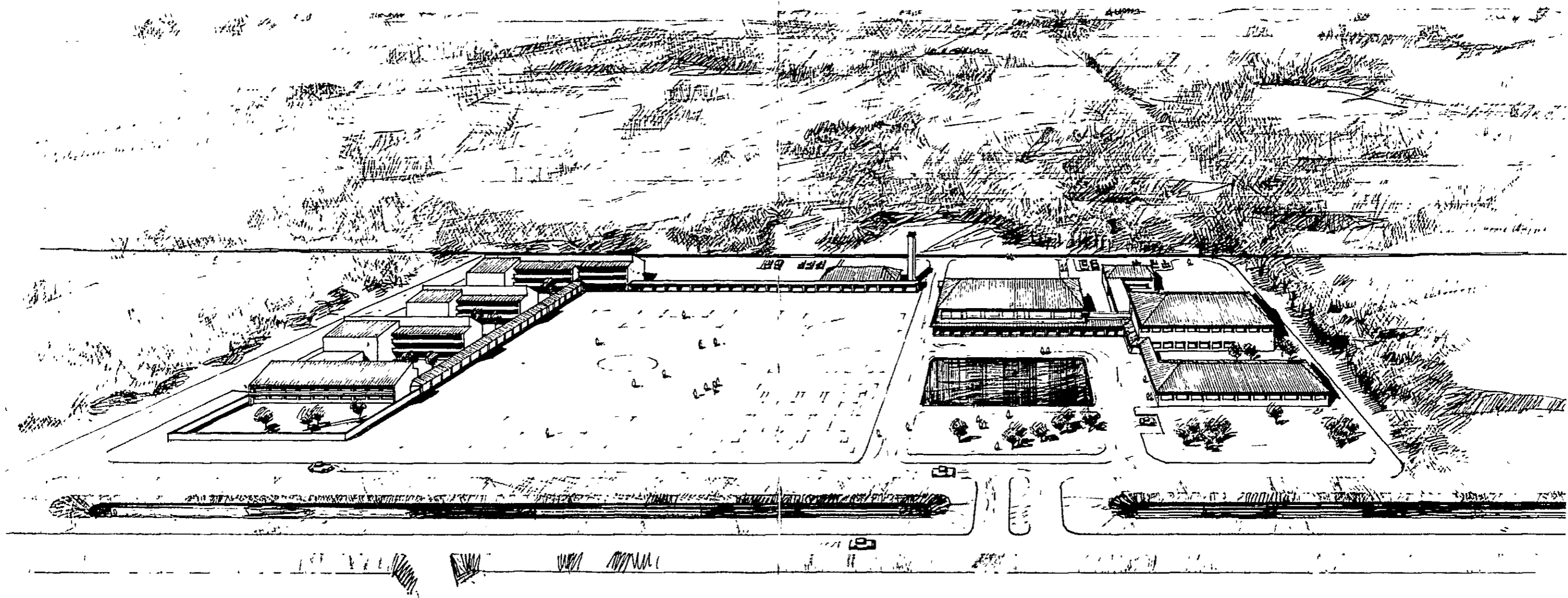
DISCUSSION
WITH KASETSART AUTHORITIES

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PLACE : KASETSART UNIVERSITY

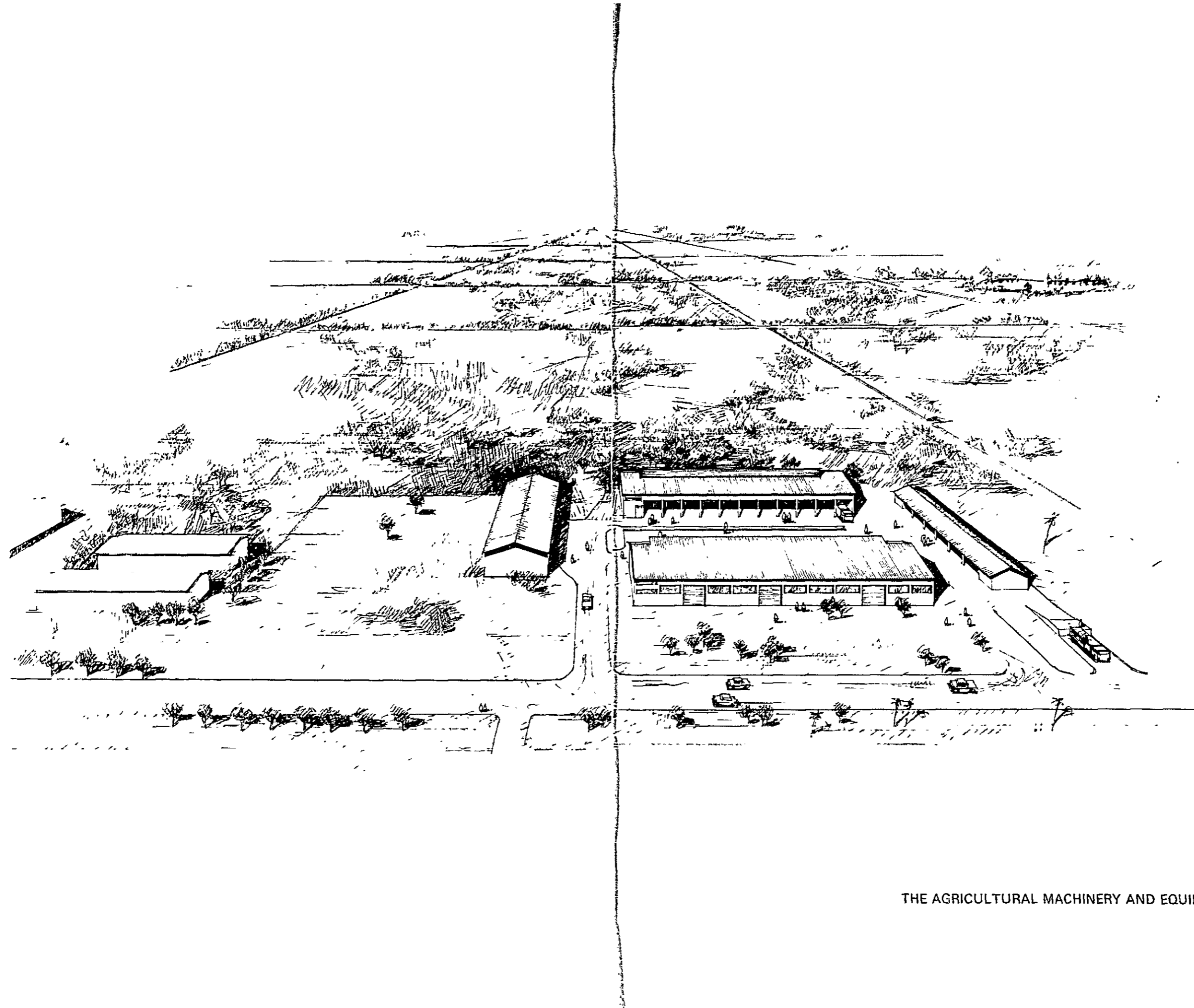


SIGNING OF MINUTES

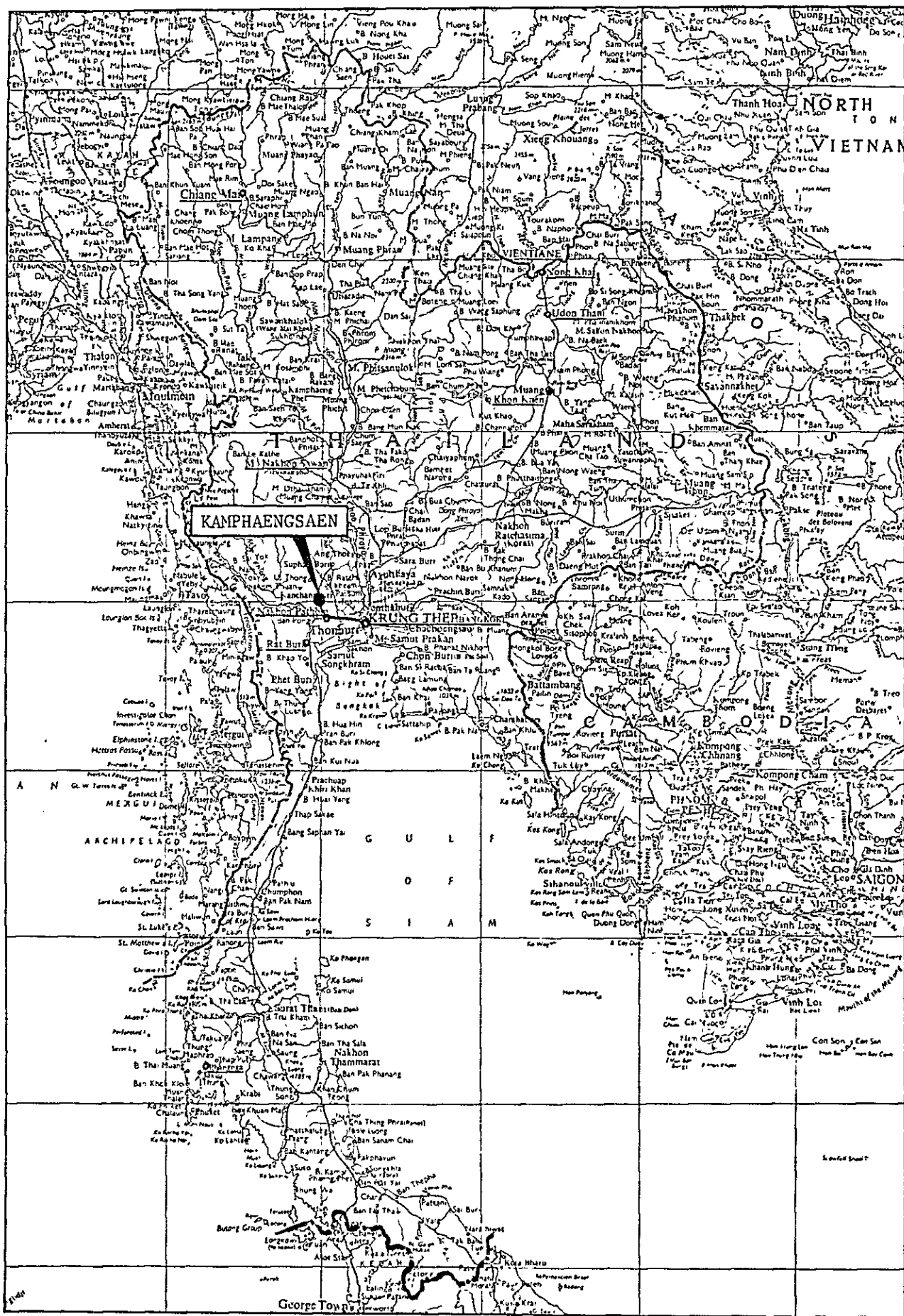
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PLACE : RS. HOTEL



THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER



THE AGRICULTURAL MACHINERY AND EQUIPMENT CENTER



MAP OF THAILAND

FOREWORD

Following a request of the Thai Government to the Japanese Government, the Japan International Cooperation Agency (JICA) conducted last year a basic designing for the construction of the Central Laboratory and Greenhouse Complex in the Kamphaengsaen Campus of Kasetsart University.

Based on this design, these buildings and facilities are now under construction with a grant aid from Japan scheduled to be completed in March 1980.

This year JICA dispatched a Preliminary Design Team for the construction in the campus of the National Agricultural Extension and Training Center and the Agricultural Machinery and Equipment Center. The Team conducted a necessary field survey and exchanged views with the Thai Authorities on this project.

After further studies based on the above survey and discussion, this design report has been completed.

I hope this report will be found useful for the construction of the centers.

I wish to express my heartfelt appreciation to the Thai Authorities and the People for their cooperation extended to the Team.

March, 1979

A handwritten signature in black ink, appearing to read 'Shinsaku Hogen', written over a horizontal line.

Shinsaku Hogen

President,

JAPAN INTERNATIONAL COOPERATION AGENCY

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1. OUTLINE OF THE PROJECT

1-1 KASETSART UNIVERSITY

"Kasetsart" in Thai means agricultural science.

The Kasetsart University is the largest of the agricultural universities in Thailand and it is the sole agricultural university that has a graduate school.

The University is situated in the same site as the Agricultural Bureau of the Ministry of Agriculture at Bankhen, approximately 15 km north of Bangkok.

The predecessor of this university was the sericulture school which was established by the Ministry of Agriculture in 1904.

Subsequently, it became the Agricultural College administered by the Ministry of Agriculture, and then, it amalgamated the Royal Forestry College.

Finally in 1943, it became the Kasetsart University comprising four faculties.

Thereafter, the University has gradually broadened its faculty. At present, the University consists of the following faculties and the organizations, as well as the facilities listed below.

1) Faculty of Agriculture

Agronomy, Animal Science, Entomology, Agricultural Machinery, Food Science, Home Economics, Horticulture, Plant Pathology, Soil and Fertilizer.

- 2) Faculty of Fishery
Agriculture, Fishery Biology, Fishery Management,
Fishery Products, and Marine Science.
- 3) Faculty of Forestry
- 4) Faculty of Veterinary Science and Arts
- 5) Faculty of Science
- 6) Faculty of Engineering
- 7) Faculty of Education
- 8) Faculty of Economics and Business Administration
Agricultural Economics, Economics, Accounting,
Business Administration, Cooperatives, and Marketing
- 9) Faculty of Social Science
- 10) Graduate School
- 11) Agricultural Extension and Training Office
- 12) Institute of Food Research and Product Development
- 13) University Library
- 14) Research and Development Institute
National Corn and Sorghum Research Center

In addition with the above, the University bears the responsibility for operating six agricultural experiment stations, tow fishery experiment stations, and five forestry experiment stations.

1-2 THE KASETSART UNIVERSITY DEVELOPMENT PROJECT

Kasetsart University functions as an academic institution for education, research, and extension and training in various fields of study with the emphasis on agricultural science.

Insofar as agricultural research, extension, and training are concerned, it appears that the University has not been provided with adequate facilities.

For the extension and training, the University has thus far set up an extensive agricultural extension and training secretariat (same status as that of a faculty). For research activities, it has organized a research council consisting of representatives from major fields of study.

Therefore, to date, the University does not have an independent research laboratory.

Many of the facilities for education of the University have been very old and currently, the Bangkhen campus is surrounded by a rapidly growing urbanization area and from the standpoint of agricultural education, the university site environment is becoming increasingly inappropriate. In addition, the area of campus is not adequate for expansion, and the coexistence with the facilities of the Department of Agriculture of the Ministry of Agriculture brings about certain inconveniences.

Consequently, Kasetsart University has been undertaking a program for an educational facility improvement and expansion and academic staff development.

Under this program it has acquired a vast area of land of 1,248 ha, for a second campus at Kamphaengsaen (near Nakhon Pathom), about 80 km north northwest of Bangkok.

The University has already completed land preparation for the said campus.

A fence has been erected around the campus site. Part of the road, power supply and the building are now under construction.

The construction for the educational facilities also includes alteration of the buildings on the Bangkok campus.

A total of 35.3 million dollars comprising the loan (15.4 million dollars as loan from the World Bank and 19.9 million dollars from the Thai Government budget) has been appropriated for the said program.

In the first phase of development of the Kamphaengsaen campus, the agriculture faculty building with a capacity of 1,100 students (provisionally), university administrative office, library, health center, central dining hall, gymnasium, elementary school, dormitory, and staff housing are scheduled to be constructed.

The entire construction work for this first phase of development has been scheduled to be completed in September, 1979.

1-3 REQUEST FOR ASSISTANCE FROM THE KASETSART
UNIVERSITY TO THE JAPANESE GOVERNMENT
AND THE PROGRESS UP TO THE TIME OF THIS SURVEY

The loan from the World Bank referred to above was appropriated primarily for educational facilities, and there was no good prospect for sufficient financial support for the needed facilities the agricultural research, extension, and training.

At the end of 1976, the Thai Government solicited, through the Japanese Embassy in Thailand, the possibility for grant aid from the Government of Japan for the construction of the critically lacking facilities.

Subsequently, Kasetsart University made a formal request to the Japanese Government for the aid.

The original request which Kasetsart University submitted to the Government of Japan, through the Government of Thailand was for the establishment of the following facilities.

- 1) Central Laboratory and Greenhouse Complex
- 2) Agricultural Extension and Training Service Center
- 3) Soil and Fertilizer Research Center
- 4) Agricultural Machinery and Equipment Center
- 5) Fresh-water Fisheries Research Center
- 6) Agro-industry Technology Research Center

The construction of the Central Laboratory and Greenhouse Complex is presently under way as the Japanese Grant Aid Project for the Japanese fiscal year of 1978.

In July of 1978, the Government of Japan dispatched a technical cooperation survey team to Bangkok for the Kasetsart University Development Project.

The survey team confirmed, following careful investigation and discussion with Kasetsart University authorities as well as officials from the ministries and bureaus concerned of the Thai Government, that this project would greatly contribute to the progress and development of Thai agricultural education, that the project plan of work has been carefully worked out, and that the project would be very feasible.

As a result of further study of the Government of Japan, the National Agricultural Extension and Training Service Center in 2) and the Agricultural Machinery and Equipment Center in 4) were chosen for possible grant aid, with the preliminary design survey to be carried out in advance.

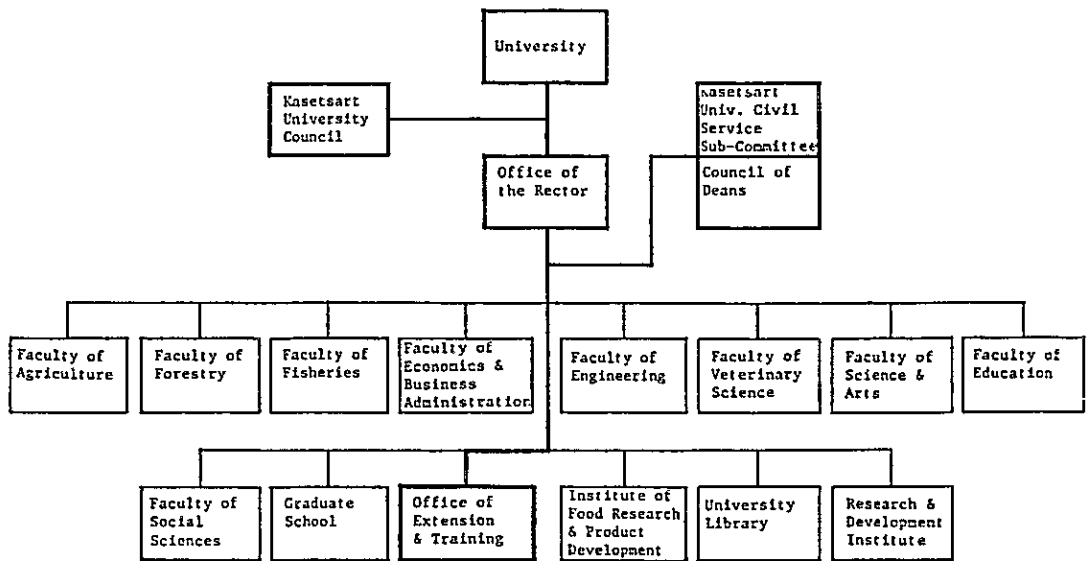
1-4 ROLES AND FUNCTIONS OF THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

It is very apparent that there is a strong prospect for rapid improvement and advancement in the various techniques in agricultural production in Thailand and that employment of such improved and advanced techniques will become increasingly wide-spread among the general farmers. In order to fully utilize the highly-advanced agricultural techniques, it is necessary to enhance the technological level of the farmers.

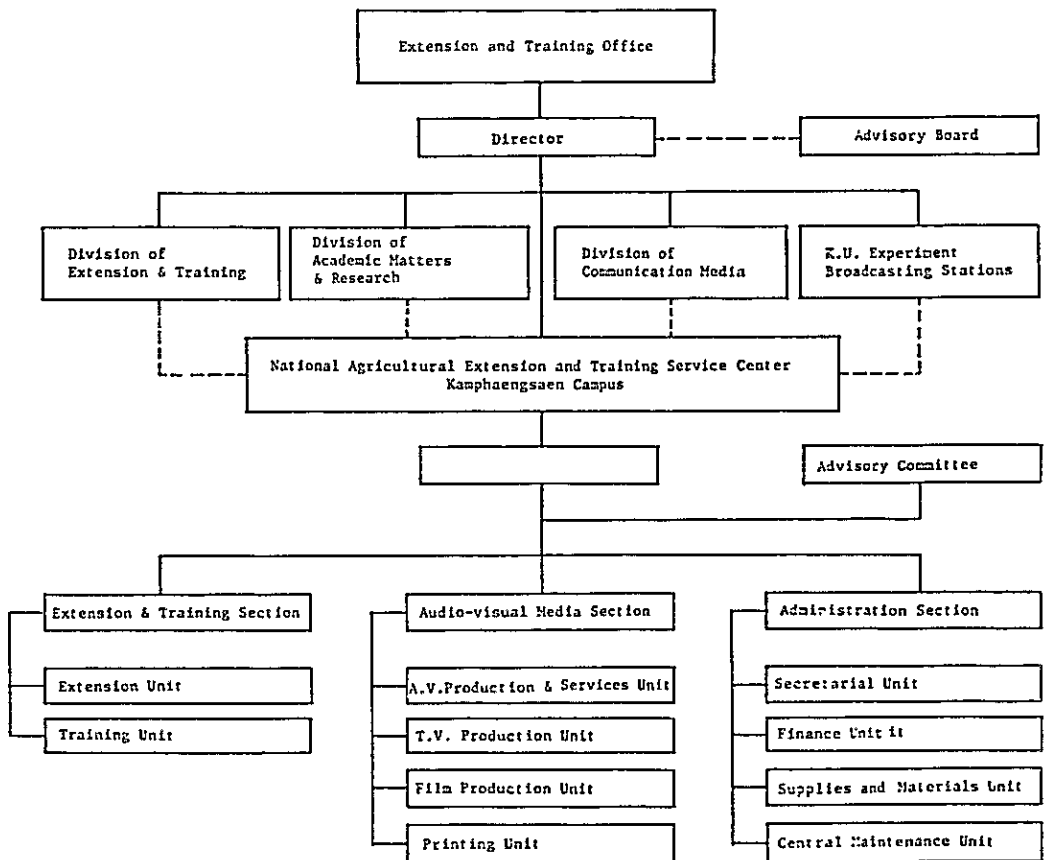
The National Agricultural Extension and Training Service Center is aimed at providing the farmers with technical information and advice on farming and general biological science, as well as opportunities for training in pertinent modern techniques.

To elevate the level of the overall technology of the farmers, this center is designed to perform its designated functions, with the aid of audio-visual system, which includes motion pictures, TV sets, slides, cassette tapes, printed materials, etc.

The Center is also planned to serve as a storehouse for data and information that are necessary for efficient extension and training; to educate farmers, personnel of various government agencies, and those engaged in crop production by way of short-term vocational training; and to study and conduct researches on farming techniques and extension and training methodology for efficient and effective extension and training programs.



ORGANIZATION OF KASETSART UNIVERSITY



ORGANIZATION OF THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

1-5 ROLES AND FUNCTIONS OF THE AGRICULTURAL MACHINERY AND EQUIPMENT CENTER

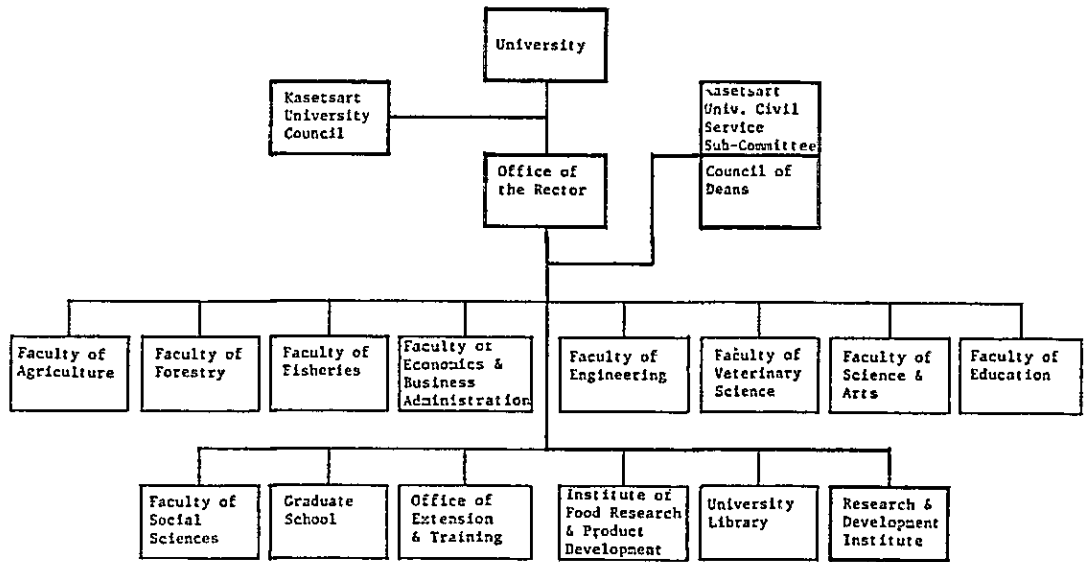
Remarkable progress in farm mechanization has been continually taking place in Thailand during recent year.

It is apparent that agricultural machinery and equipment will be used widely in the near future. Therefore, it is important to provide adequate technical training for those engaged in the production of agricultural machinery and equipment as well as for the farmers, and to establish an appropriate system for compiling pertinent research finding, in addition to the promoting research on the various aspects of agricultural machinery and its application.

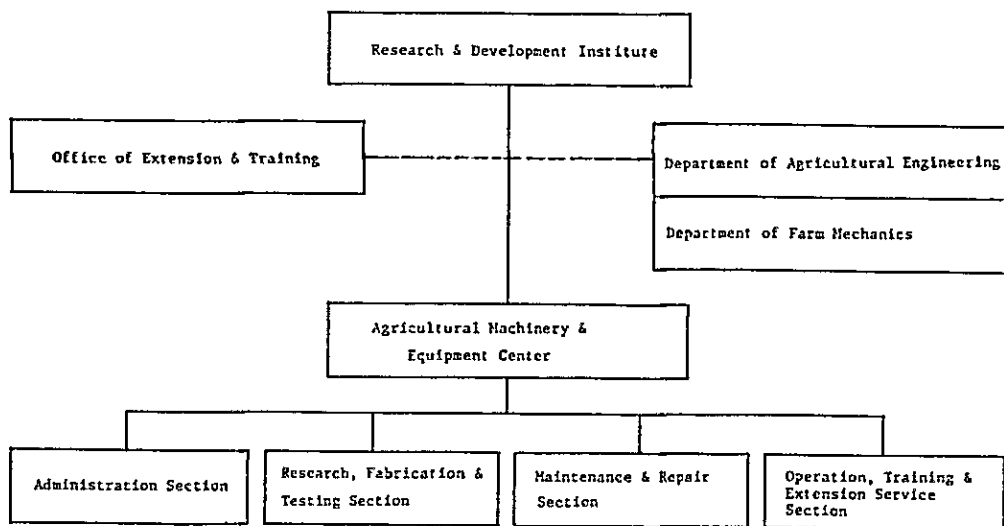
Practically, however, Kasetsart University merely bears the responsibility for agricultural education and it owns only two tractors and a small-scale farm-tool fabricating plant in so far as agricultural machines and related facilities are concerned.

This Center will be charged with the responsibility of examining and evaluating the performance of various agricultural machines and equipment, and training the farmers in various techniques for proper use, care and fabrication of farm tool and equipment.

Moreover, the Center will be responsible for checking, repairing, and maintaining farm machinery and equipment so as to promote mechanization in the agricultural production.



ORGANIZATION OF KASETSART UNIVERSITY



ORGANIZATION OF THE AGRICULTURAL MACHINERY AND EQUIPMENT CENTER

2. DISPATCH OF THE PRELIMINARY DESIGN SURVEY TEAM

2-1 PURPOSE OF SURVEY

In 1977, the Government of Thailand requested the Japanese Government for a grant aid and technical assistance; the latter includes request for dispatchment of Japanese experts in various fields of agricultural science and that for fellowships for Thai trainees to be trained in Japan in connection with the implementation of the Kasetsart University Development Project and the operation of the various facilities to be established under the Project.

In reply to this request, the Government of Japan dispatched two separate survey teams to Thailand in 1977.

As mentioned earlier, construction of the Central Laboratory and Greenhouse Complex, one of the facilities to be established under the Kasetsart University Development Project, is now under way as a grant from the Japanese Government for the Japanese fiscal year 1978.

A preliminary design survey team for the National Agricultural Extension and Training Service Center and the Agricultural Machinery and Equipment Center was dispatched to Thailand in November, 1978 in accordance with the recommendation of the Technical Cooperation Survey Team that visited Thailand in July, 1978.

The purpose of this preliminary design survey team was to grasp the anticipated roles and functions of the National Agricultural Extension and Training Service Center and the Agricultural Machinery and Equipment Center under the Kasetsart University Development Project, for which Kasetsart University, with the consent of the Thai Government, had requested the Government of Japan for a grant aid for the Japanese fiscal year 1979.

In addition, the preliminary design survey team also exchanged views with officials of both the Thai Government and Kasetsart University concerning the scope and contents of this portion of the Project, and examined the site to be used for the construction of the two centers so as to obtain the necessary data for estimating the scale of the grant aid and preparing the pertinent preliminary design.

2-2 MEMBERS OF THE PRELIMINARY DESIGN SURVEY TEAM

The survey team was organized consisted of seven members with Mr. Suzuki who is a Former Councilor of the Secretariat of Agriculture, Forestry and Fisheries Research Council, Ministry of Agriculture, Forestry and Fisheries as the leader. The name, assignment and position of each team member are as follows:

<u>Assignment</u>	<u>Name</u>	<u>Position</u>
Team Leader	Mr. Akio SUZUKI	Former Councillor Secretariat of Agriculture, Forestry and Fisheries Research Council Ministry of Agriculture, Forestry and Fisheries
Farm Machine	Mr. Kensuke ARAI	Senior Officer of Farm Machinery Training General Affairs Division Agricultural Production Bureau Ministry of Agriculture, Forestry and Fisheries
Coordination	Mr. Toyoki NODA	Officer Second Accounting Division Finance and Accounting Department Japan International Cooperation Agency
Architectural Design	Mr. Hiroshi IZUHARA	Architect International Department Kume Architects-Engineers
Structural Engineering	Mr. Akio KANNO	Architect Architectural Design Department Kume Architects-Engineers
Equipment	Mr. Shuhei KUBOTA	Technical Advisor Kume Architects-Engineers
Mechanical Engineering	Mr. Makoto TANAKA	Engineer International Department Kume Architects-Engineers

2-3 THAI AUTHORITIES CONCERNED

• Department of Technical and Economic Cooperation - DTEC

Dr. Xujati Pramoolpol	Director-General
Mr. Wanchai Sirirattna	Deputy Director General
Mr. Thawal Polpuech	Colombo Plan Program Officer
Mr. Apimuk Sukprasit	
Mr. Pracha Chaosin	

• Kasetsart University

Prof. Rapee Sagarik	Chairman, Rector
Prof. Dr. Sutharm Areekul	Vice-Chairman, Vice-Rector for Academic Affairs
Prof. Dr. Phaitoon Ingkasuwan	Vice-Rector for Business Affairs
Prof. Arb Nakajud	Vice-Rector for Development
Assoc. Prof. Dr. Watana Stienswat	Vice-Rector for Kamphaengsaen Campus
Assist. Prof. Dr. Aroon Jantanao	Dean of Faculty of Agriculture
Prof. Dr. Krisna Chutima	Dean of Faculty of Science and Arts
Assist. Prof. Boonsom Suwachirat	Dean of Faculty of Engineering
Assist. Prof. Dr. Kamphol Adulavidhya	Director of Research and Development Institute
Mr. Porn Suwanvajokkasikij	Director of Extension and Train- ing Office
Prof. Pavin Punsri	Director of Highland Agricultural Research Project
Dr. Sam-arng Srinilta	Coordinator, Thailand-Japan Project for Kasetsart University
Dr. Prachak Chareon	Deputy Coordinator and Liaison Officer, Thailand-Japan Project for Kasetsart University
Dr. Amnat Suwanarit	Soil Fertility

Dr. Sookapracha Vachanonda	Organic Chemistry
Mr. Sophon Duangswasdi	Cooperative
Mrs. Chamrasratna Pichaicharnarong	Marketing
Mr. Wittawat Buachan	Soil Science
Mr. Poom Khumgliang	Agricultural Extension
Mr. Tatchai Saengaingkaew	Agricultural Extension
Mr. Suchote Daosukho	Agricultural Extension
Dr. Thira Chaichanavong	Civil Engineering
Mr. Kumropluk Suratsawadi	Architecture
Mrs. Yupayong Hemasilpin	Architecture
Mr. Sermphol Buengsung	Agricultural Engineering
Mr. Ackradej Artachinda	Agricultural Engineering
Mr. Ban Chaw Bhaholyothin	Agricultural Engineering
Dr. Supot Fuangfupong	Agronomy
Dr. Jaroon Kumnuanta	Microbiology
Dr. Neungpanich Sinchaisri	Insect Toxicology
Dr. Thira Sutabutra	Plant Virology
Mr. Thanakorn Jarupat	Plant Virology
Dr. Supat Attathom	Plant Virology
Mr. Wattana Swanyatipati	Agricultural Extension
Miss Channuan Tansathit	English
• Embassy of Japan in Thailand	
Mr. Hiroyuki Yushita	Counselor
Mr. Hiromi Imafuji	First Secretary
• Japan International Cooperation Agency - JICA, Bangkok Office	
Mr. Yasuo Kitano	Director
Mr. Ryu Suwa	Staff member of the Office

3. SUMMARY AND MINUTES OF THE DISCUSSIONS

3-1 PROGRESS OF THE DISCUSSIONS

The survey team members held a meeting prior to the departure for Thailand to study the assigned task.

In this meeting, it was unanimously decided that in advance of the survey, the team leader would inform the Thai officials concerned of the purpose and expected outcome of the survey in the form of a statement, which reads as follows:

"I may explain the objective of this Survey Team.

It is, based on the results obtained by the Technical Cooperation Survey Team, last July, to confirm the extent of the intended financial cooperation concerning buildings and equipment in the National Agricultural Extension and Training Service Center and also to confirm the Agricultural Machinery and Equipment Center by the Japanese grants to contribute to the development of the Kasetsart University.

In addition to the above, we would like to formulate specifications for the implementation design which will be carried out in the next stage.

However, with regard to the Japanese Government's budget for fiscal 1979, the budget draft which will be submitted to the Parliament for approval at the beginning of 1979, is now being prepared by the Ministry of Finance. Therefore, no definite magnitude of grant aid for this project can be disclosed at this stage."

The full English version of this statement is given in Appendix. In addition to the above, the team members specializing in architectural designing, prepared the basic data in English for the preliminary design survey to negotiate with the Thai officials.

The survey team paid a courtesy visit to the Ministries concerned and called on the University officials, and successively, it had a substantial discussion with both, the governmental and university officials. The following is a summary of the discussion.

3-2 SUMMARY OF THE DISCUSSIONS

The discussion was held at the conference room in the Auditorium of the Kasetsart University, with the participation of the DTEC personnel. The Rector of Kasetsart University also attended the discussion at his own free will. Throughout the discussion, an earnest deliberation of opinions and comments concerning all pertinent matters by members of the two parties took place.

The main points of the discussion are as follows:

At a general meeting, the Rector delivered a greeting message to welcome the visit of the survey team and the revisit of the team leader.

Then, the survey team leader explained the purpose of the survey team and the pivotal points to be deliberated at the discussion as in the statement described previously.

Following the explanation of the Japanese side, the Thai officials showed their understanding of the purpose of the visit of the survey team.

They also appraised highly this second visit of the team leader as it would greatly facilitate smooth continuation of the Project.

To the question of the Thai side of whether or not the aids would be extended at the same time for the construction of the National Agricultural Extension and Training Service Center and the Agricultural Machinery and Equipment Center, the Japanese side promised to strive their utmost to facilitate materialization of the wish of the Thai side.

Both parties entered into a substantial discussion.

First, the Thai side submitted a list of equipment and machinery to be furnished for these two centers, including the items proposed by the University officials to the survey team.

The Thai officials explained the contents of this list, and the team members asked questions about the contents.

In this way, questions and answers were earnestly exchanged between the two parties.

Regarding the National Agricultural Extension and Training Service Center, no major change in its roles and functions was seen, compared with those proposed by the Thai side to the previous survey team (July, 1978).

With regard to the Agricultural Machinery and Equipment Center, the main functions indicated previously included testing and research for preparing standards for inspection of the agricultural machinery and equipment, as well as training as a joint undertaking with the National Agricultural Extension and Training Service Center. However, these functions were replaced by the expansion of agricultural machinery and the training tour activities by the Center, as well as performance of tests and research on agricultural machinery.

The survey team requested the Thai side to prepare a document showing sequence of priority

of the required machines and equipment and additional specifications of the machinery to be used particularly for the Agricultural Machinery and Equipemnt Center, so that the roles and functions of both facilities would be grasped clearly and the amount of fund would be more conveniently determined.

The Thai side indicated that such document would be made ready for submission to the survey team within the period of the visit.

Besides the general meeting, special discussions were held among the architect designers from both sides for purpose of examining specific viewpoints and design framework proposed by the Thai side, as well as reviewing the observations during the visit to the field at the Kamphaengsaen campus.

Parallel with the above discussion, the agricultural machinery group held a series discussions with selected agendas involving the various aspects of the agricultural machinery and equipment to be provided for the Agricultural Machinery and Equipment Center.

Minutes of the discussions were compiled.

3-3 MINUTES

MINUTES OF THE DISCUSSIONS
ON THE PRELIMINARY DESIGN SURVEY
FOR THE KASETSART UNIVERSITY DEVELOPMENT PROJECT


At the request of the Government of the Kingdom of Thailand for the grant in order to contribute to the development of Kasetsart University (hereinafter referred to as "The University"), the Government of Japan through Japan International Cooperation Agency (hereinafter referred to as "JICA") has sent a Survey Team of Technical Cooperation led by Mr. Akio Suzuki, Former Councillor, Secretariat of Agriculture, Forestry and Fisheries Research Council, Ministry of Agriculture, Forestry and Fisheries, for the Kasetsart University Development Project from 5th to 22nd July, 1978.

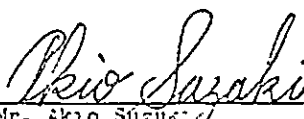
Having considered the outcomes of the abovementioned survey, the Government of Japan decided to send the Preliminary Design Survey Team (hereinafter called "the Survey Team") organized by JICA and led by Mr. Suzuki. The Survey Team visited Thailand for ten days from 7th November 1978 with the purpose of having more detailed discussion on the project so that JICA would be able to make preliminary design for the construction of the National Agricultural Extension and Training Service Center and also the Agricultural Machinery and Equipment Center of the University at Kamphaengsaen campus.


The Survey Team held a series of active discussions and exchanged views with the Thai authorities concerned and both parties have agreed to recommend to their respective Governments to take further necessary steps on the contribution to the University's development project under the possible Japanese grant in fiscal year 1979 which begins in April.

Minutes of the discussions are attached herewith.

Bangkok, November 15, 1978


Prof. Rapee Sagarin
Rector
Kasetsart University


Mr. Akio Suzuki
Team Leader
Japanese Preliminary
Design Survey Team for
Kasetsart University
Development Project


for Mr. Kujati Prasertpol
Director-General
Department of Technical
and Economic Cooperation

M I N U T E S

1) The Survey Team could achieve its objectives with active cooperation of staff members of Kasetsart University and Department of Technical and Economic Cooperation.

2) The Survey Team firmly believed that the possible grant for construction of the National Agricultural Extension and Training Service Center and the Agricultural Machinery and Equipment Center would contribute to strengthening extension, training and research activities in the field of agriculture, thereby eventually contributing to economic development of Thailand.

3) The Thai side fully understood the Japanese budget system under which definite figures could not be released until Parliament would approve the fiscal year 1979 budget in spring of 1979

4) Because of the limitation of the budget, it would not be possible to cover all of the buildings and equipment which were included in the initial Thai requests under Japanese grant. Therefore, both parties made efforts to select some of the important and essential buildings in accordance with the priority given by the University.

The buildings which would likely be covered by the grant are shown in Annex I as agreed upon by both parties.

5) Both parties agreed on the demarcation of responsibilities in actual construction works which should be carried out by the respective Governments.

The infrastructural works and auxiliary facilities indispensable for construction of the buildings should be provided by Thai side. The works under this category are shown in Annex II as agreed upon by both parties.

6) The Survey Team expressed its view that some equipment necessary for the National Agricultural Extension and Training Service Center and also the Agricultural Machinery and Equipment Center would be provided within the limit of budgetary allocation of the grant

7) The Thai side expressed warm welcome and extended active cooperation in all aspects of the survey activities during the entire period of stay. The Japanese side expressed its utmost gratitude to the Thai counterparts and recognized that the cooperation extended by them facilitated its survey activities greatly.

Annex I. Buildings to be provided by the Government of Japan

1) The National Agricultural Extension and Training Service Center.

Administrative Building.

Audio-Visual Media Building.

Printing Shop.

Classroom Building.

Canteen.

Dormitory.

Circulation.

Housing facilities for Japanese experts (the site will be suggested later by the University).

2) The Agricultural Machinery and Equipment Center.

Administrative Building.

Workshop and Research Laboratory.

Farm Equipment Building.

Annex II Items the necessary measures for which are to be taken by the Government of Thailand

- 1) Infrastructural Work
 - a) Clearing and leveling of both construction sites before the start of construction, including earth filling to the level of at least 6.5 meters above sea level.
 - b) Provision of electrical main, water supply, drainage and telephone facilities necessary for the buildings.
- 2) Building construction
 - a) Housing.
 - b) Demonstration hall.
- 3) External work
 - a) Fence.
 - b) Lawn and planting.
 - c) Sports area.
 - d) Road signs and lighting at the approach to National Agricultural Extension and Training Center from Chonpratan Road.
- 4) Furniture and miscellaneous items
 - a) Office furniture, filing cabinets, lockers, etc.
 - b) Linens for dormitory.
 - c) Tableware and silverware for canteen.
 - d) Utensils for kitchen.
 - e) Miscellaneous items.
- 5) Expenses necessary for unloading and customs clearance of imported equipment and other materials required for installation and use at these centers at ports of disembarkation in Thailand and internal transportation thereof to construction sites.

4. SITE SITUATION

4-1 OUTLINE OF THE SITE OF KAMPHAENGAEN CAMPUS

Kamphaengsaen campus is situated 65 km away from Bangkok, the capital of Thailand, in the west westnorth direction. It occupies a total land area of approximately 1,200 ha.

The southeast corner of this campus is located at the intersection between the latitude 14°00" north and the latitude 100°00" east.

The site is somewhat rhombic in shape. It measures approximately 3.7 km from east to west and about 3.5 km from north to south. The ground level at the center of the eastern portion is 3m above sea level while that at the center of the western portion is 9m above sea level.

The entire area is sloping slightly from east to west, with average elevation ranging from 6 to 7m from sea level.

Master plan of this campus had been worked out in October 1973 by Demonte Chan/Rader Campus Planning Consultants of San Francisco, U.S.A.

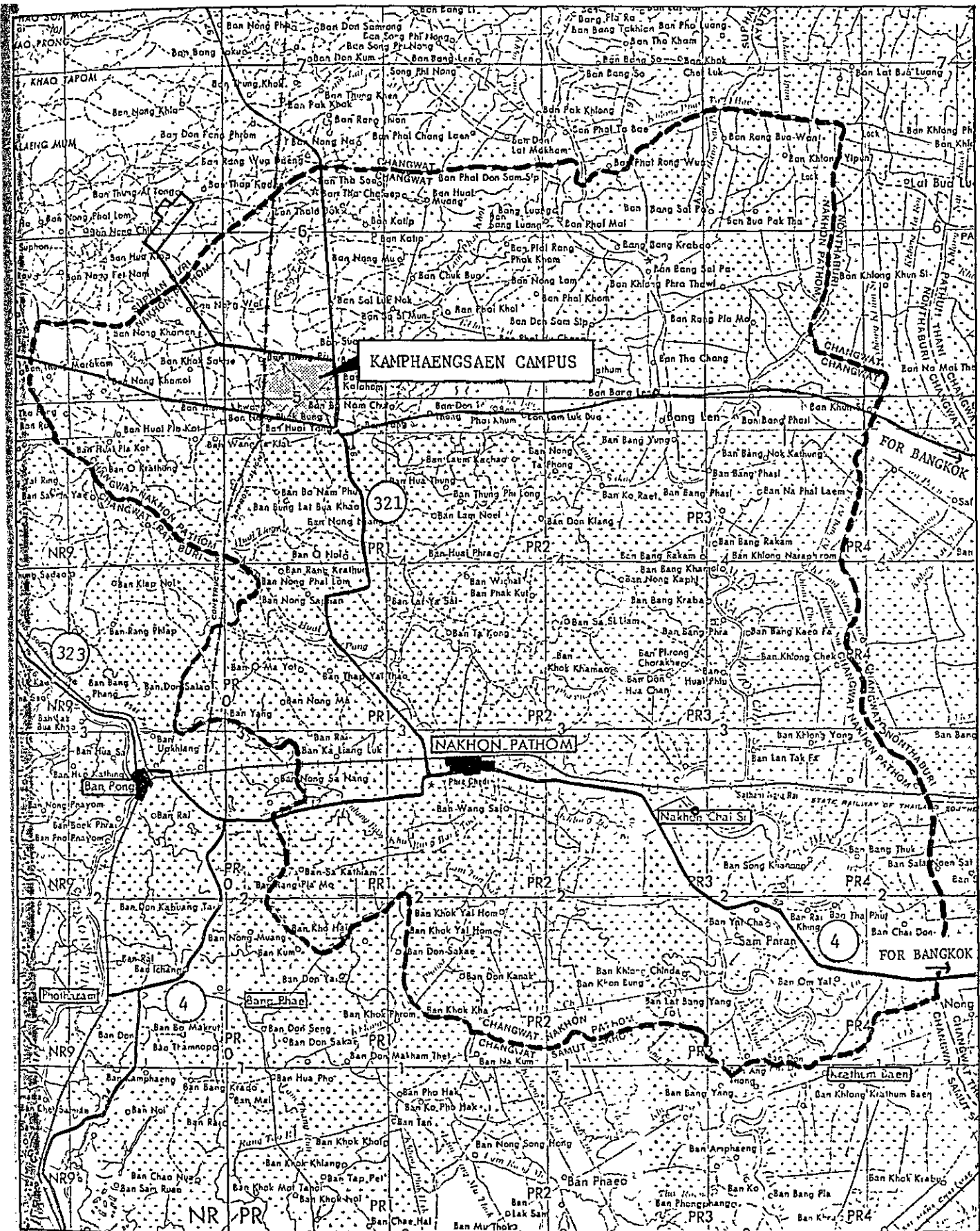
Grading of land in accordance with such plan is in progress at the time of this survey.

The master plan indicates major zoning of the campus into two sections with a main service road running north to south across the central part.

On the west side of the main service road is field area and on the east, university administration building, central library, central classroom building, gymnasium, health center, faculty club, central dining hall, buildings for various faculties, student dormitories and staff housing have been planned for construction on the southern half, which is intended to be the academic core of the campus. As a matter of fact, construction of these buildings has been in progress and should reach completion in the near future.

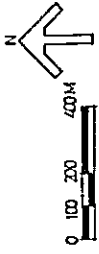
Main gate to the campus is located at about midway of the east boundary facing Road No. 321 (Malaiman Road).

Starting from the main gate, a main road completely paved and furnished with street lighting runs to the west; meeting another main road, which has side pavements totally separated from the roadway, that runs on the outer circumference of the academic core.

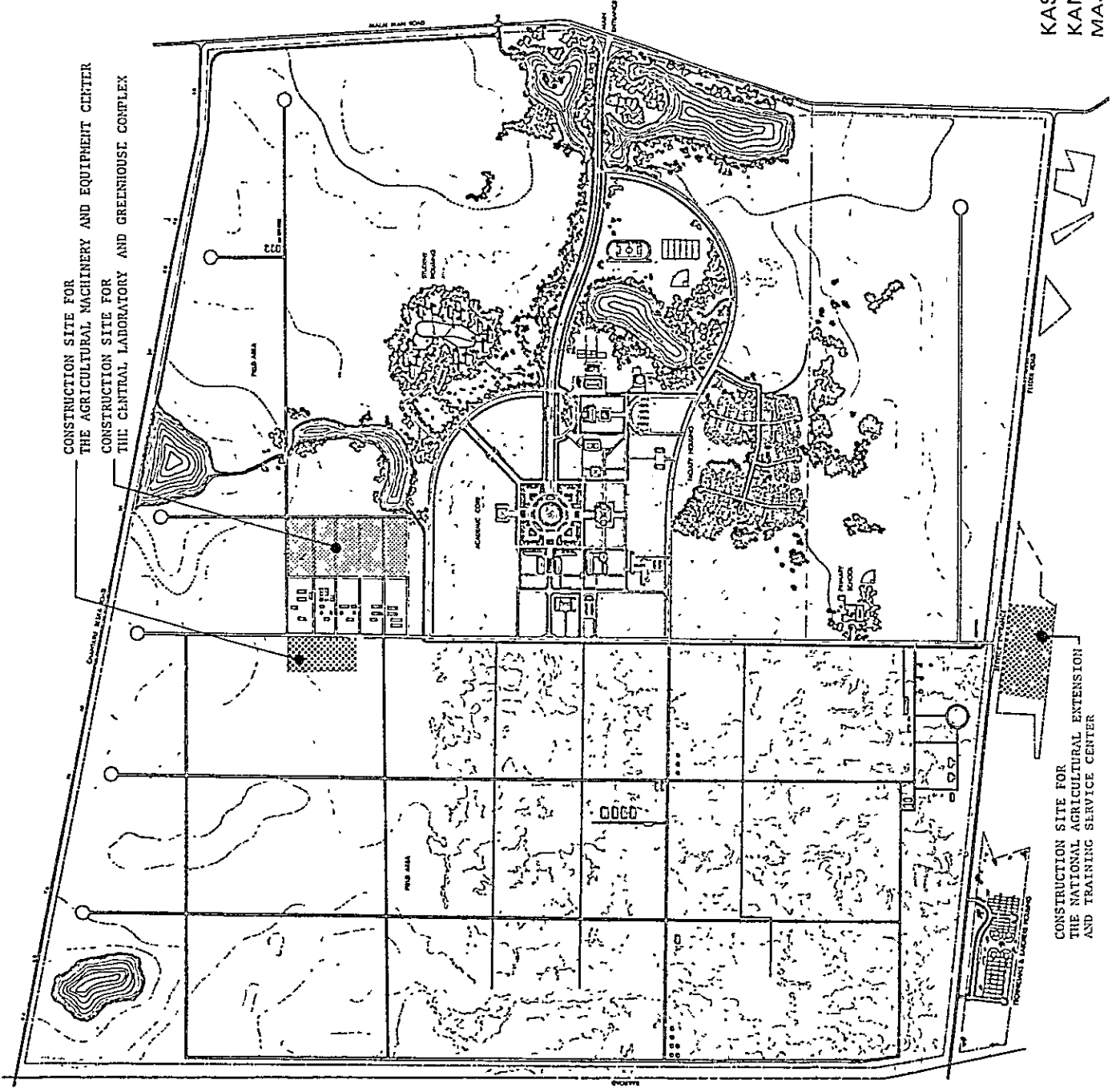


CHANWAT NAKHON PATHOM

LOCATION OF KAMPHAENSAEN CAMPUS

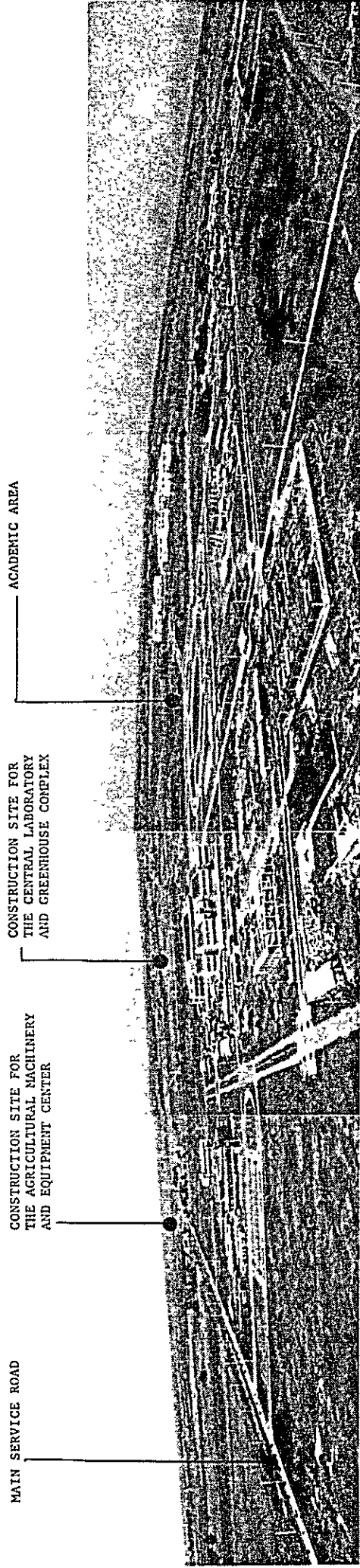


CONSTRUCTION SITE FOR
THE AGRICULTURAL MACHINERY AND EQUIPMENT CENTER
CONSTRUCTION SITE FOR
THE CENTRAL LABORATORY AND GREENHOUSE COMPLEX

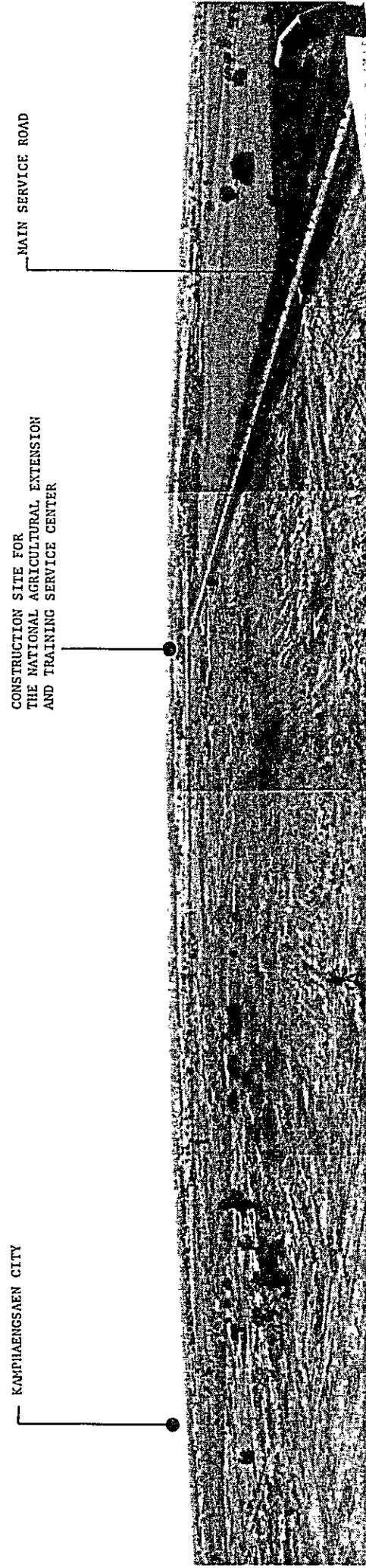


KASETSART UNIVERSITY
KAMPHAENGAEN CAMPUS
MASTER PLAN

KAMPHAENSAEN CAMPUS



NORTH VIEW OF THE CAMPUS FROM THE HIGH ELEVATED TANK



SOUTH VIEW OF THE CAMPUS FROM THE HIGH ELEVATED TANK

4-2 OUTLINE OF CONSTRUCTION SITES

The National Agricultural Extension and Training Service Center

The site selected for this center is located along the south side of the Chon Pratan road extending in the east-west direction on the southern edge of the campus. It is a flat terrain measures 360 m from east to west and 173 m from north to south, with a total area of 62,280 m².

Up to last year, the site had been a swamp at an elevation of about 3 m above sea level.

However, since then the Thai side has performed soil grading and earth filling at the site.

Because the level of the site is still considerably lower than that of Chon Pratan Road, the Thai side decided to proceed further with soil grading and earth filling at the site so as to raise the level to at least 6.5 m above sea level before starting the construction.

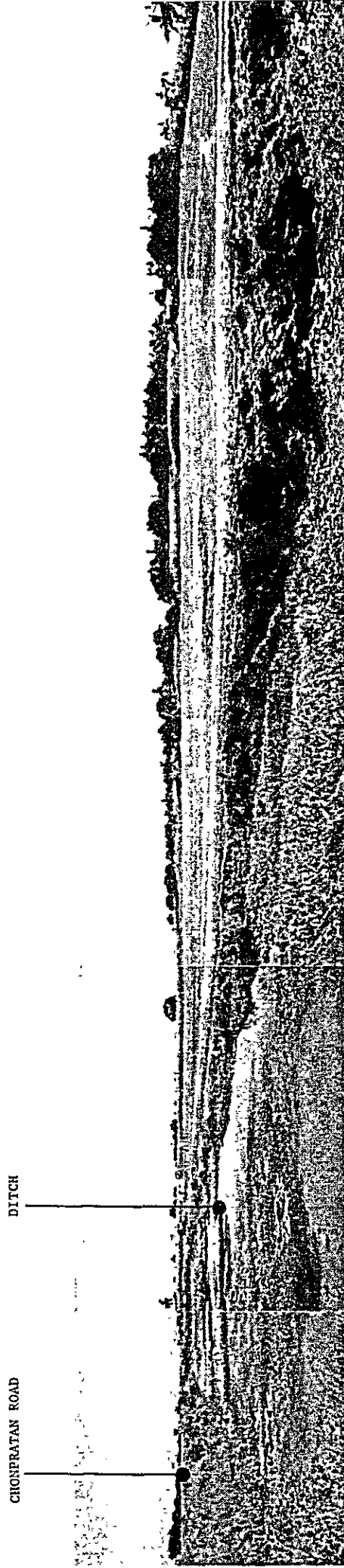
The Agricultural Machinery and Equipemnt Center

The site selected for this center is located at approximately the middle of the northern half of the campus. It is adjacent to and on the west side of the road which runs across the campus in the direction from the service gate at the southern edge to the north. The site is a rectangular terrain which measures 250 m from east to west and 100 m from north to south and is sloping downward from west to east, with a total area of 25,000 m².

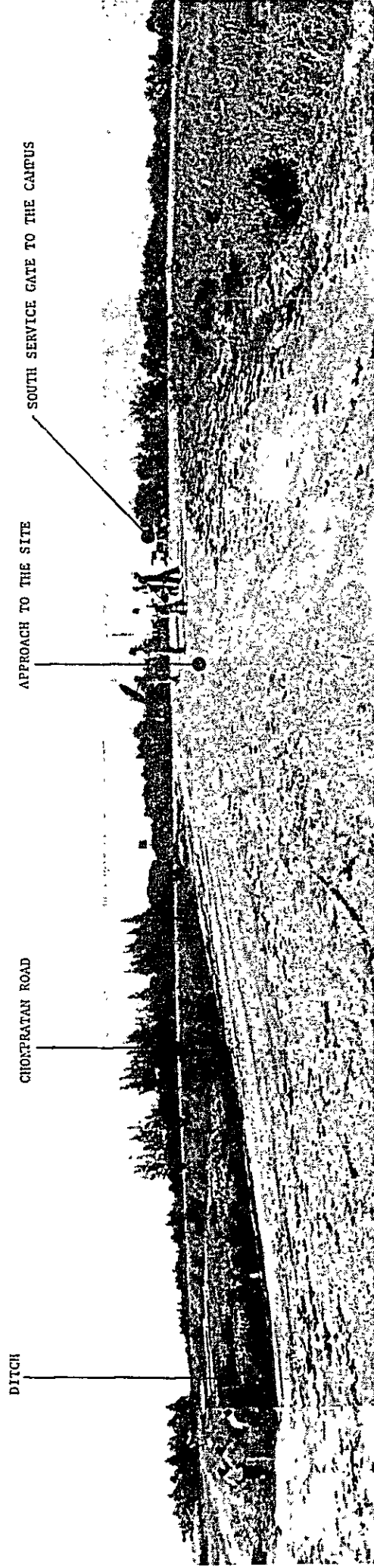
At the time of this survey, the elevation of the site close to the service road is slightly lower than that of the road. Therefore, the Thai side is planning to carry out weeding and earth filling as well as soil grading so as to raise the elevation of that portion adjacent to the road to 6.5 m above sea level. Part of the site has many trees. In consultations with the Thai side, a decision was reached to leave the trees as they are.

Therefore, in planning out the site, a study will be made again, and, depending on the result of such study, it is probable that the site plan may be somewhat changed from what is presented in this document.

CONSTRUCTION SITE FOR
THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER



EAST VIEW FROM THE NORTHWEST CORNER OF THE SITE

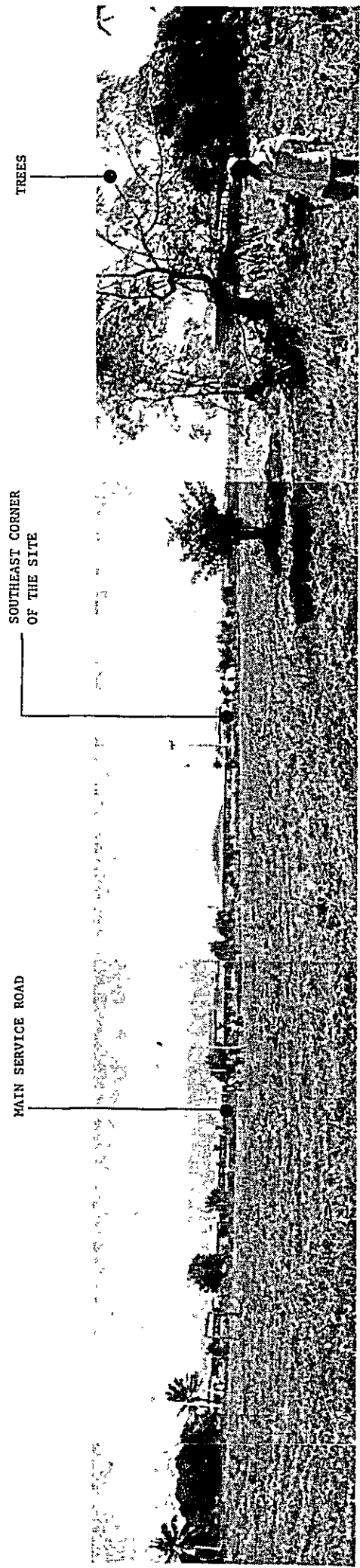


NORTHWEST VIEW FROM THE APPROACH OF THE SITE

CONSTRUCTION SITE FOR
THE AGRICULTURAL MACHINERY AND EQUIPMENT CENTER



SOUTHWEST VIEW FROM THE EAST SIDE OF THE SITE



EAST VIEW FROM THE CENTER OF THE SITE

5 PLANNING OF FACILITIES

5-1 PLANNING OUTLINE

The fundamental plan for the National Agricultural Extension and Training Center, and the Agricultural Machinery and Equipment Center of Kasetsart University Kamphaengsaen Campus is based on the report of "the Japanese Preliminary Design Survey Team for the Kasetsart University Development Project" prepared in August, 1977, and that of the Japanese Technical Cooperation Survey Team for the Kasetsart University Development Project prepared in July, 1978. In addition, technical construction problems, based on the results of the preliminary design survey and the discussion among the survey team member, were studied further. The fundamental plan is also based on the guiding principles for the "Central Laboratory and Greenhouse Complex" which is being constructed on Kamphaengsaen Campus under the Japanese Grant Aid for Japanese fiscal year 1978.

5-2 PLANNING BASES

Planning of the facilities was carried out on the following bases.

The functions for the facilities requested by Kasetsart University were clarified first. Then, the building Plans, structural plans, and plans for the service facilities were prepared keeping in mind the existing overall standard for buildings on Kamphaengsaen Campus.

- . The buildings were planned to conform with the future plans for Kasetsart University. Such planning was carried out in such a way that there would be no functional problems upon completion of the first stage of development of Kamphaengsaen Campus.
- . The plans were put together on the assumption that construction materials of desirable quality that are easily available in Thailand would be used. Construction materials other than these would be brought from Japan.
- . Conditions prevailing in Thailand, including weather, natural features, lifestyle, and construction conditions were fully considered at all times in planning out the form of construction, materials and construction methods so that they will be most suitable for the region.
- . In order to attain desirable harmony between the new facilities and the already existing or planned-for facilities on the campus, it was decided that the Kamphaengsaen Campus Master Plan prepared by Demonte-Chan / Rader, campus planning consultant, San Francisco, U.S.A., in October, 1973 would be used as guide line in the planning.

5-3 SCALE OF THE FACILITIES

The scale of the facilities shown below is, subject to change as deemed necessary during execution of the plans:-

. The National Agricultural Extension and Training Service Center

Floor Area 12,960m²

1. Administrative Building 710m² (one-storeyed building)
2. Audio-Visual Media Center 2,250m² (Two-storeyed ")
3. Printing Shop 440m² (One-storeyed ")
4. Classroom Building 2,190m² (Two-storeyed ")
5. Dormitory 6,400m² (Two and three-storeyed building)
(including 340m² of Canteen)
6. Circulation 970m²

. The Agricultural Machinery and Equipment Center

Floor Area 5,520m²

1. Administrative Building 1,280m² (Two-storeyed building)
2. Workshop and Research 3,640m² (One-storeyed ")
Laboratory
3. Farm Equipment Building 600m² (One-storeyed ")

Total Floor Area . . . 18,480m²

for both Center

LIST OF ROOMS REQUIRED

I. The National Agricultural Extension and Training Service Center

Administrative building	<ol style="list-style-type: none"> 1. Entrance hall, waiting area and exhibition space 2. Information counter, radio link and telephone junction 3. Director's office 4. W.C. for Director 5. Secretary's office 6. Waiting area 7. Deputy-director's office 8. Office for specialists 9. Office for co-ordinating staff 	<ol style="list-style-type: none"> 10. Office for training staff 11. Office for trainees 12. Conference room 13. V.I.P. room and pantry 14. General office 15. Storage 16. Library 17. W.C.
Audio-visual media building	<ol style="list-style-type: none"> 1. Section-head's office 2. Entrance hall and waiting area 3. Information counter 4. General office 5. Television production unit <ol style="list-style-type: none"> 5.1 T.V. studio 5.2 Waiting and dressing room 5.3 Control room 5.4 Video-tape recorder storage 5.5 Material storage 5.6 Technical operation room 5.7 Electric junction 5.8 W.C. & janitor 6. U.H.F. broadcasting unit 7. Audio production unit <ol style="list-style-type: none"> 7.1 Sound-track recording room 7.2 Tape recording room 7.3 Library 	<ol style="list-style-type: none"> 8. Graphic production unit <ol style="list-style-type: none"> 8.1 Drawing room 8.2 Storage 9. Photograph production and photo-lab unit <ol style="list-style-type: none"> 9.1 Picture-taking room 9.2 Dark room 9.3 Drying and washing space 9.4 Film production room 10. Public service facility unit <ol style="list-style-type: none"> 10.1 Waiting area 10.2 Film, tape, and video-tape library 10.3 Circulation-service room 10.4 Exhibition space 10.5 Pre-view room
Printing shop	<ol style="list-style-type: none"> 1. Printing area 2. Storage 1 3. Storage 2 4. Letter press room 5. Proof-reading room 	<ol style="list-style-type: none"> 6. Dark room for film offset <ol style="list-style-type: none"> 6.1 Film offset laboratory 6.2 Dark room 7. Office
Classroom building	<ol style="list-style-type: none"> 1. Audio-visual aid unit 2. Classroom 3. Discussion room 4. Training room 5. Coffee-break space 	<ol style="list-style-type: none"> 6. Printing officer room 7. Sound-control room 8. Office for staff 9. Auditorium
Canteen	<ol style="list-style-type: none"> 1. Dining room 2. Cooking space 3. Cold room 4. W.C. 	
Dormitory		
Circulation		

II. The Agricultural Machinery and Equipment Center

Administrative building	<ol style="list-style-type: none"> 1. Director's office 2. Deputy-director's office 3. Office space for supervisors 4. Document storage 5. General office and information 6. Waiting area and entrance hall 7. W.C. 8. Lecture room 	<ol style="list-style-type: none"> 9. Testing and research unit <ol style="list-style-type: none"> 9.1 Office for staff 9.2 Office for researcher 10. Training and demonstration unit <ol style="list-style-type: none"> 10.1 Office for staff 11. Living room 12. Conference 13. Circulation
Workshop and research laboratory	<ol style="list-style-type: none"> 1. Testing and research laboratory 2. Fine-equipment storage 3. Major-equipment storage 4. Space for machine tool 5. Clean-up area 6. Space for carpenter tool (Wood working area) 	<ol style="list-style-type: none"> 7. Maintenance area 8. Offices for staff 9. Shower room and locker 10. Platform for washing 11. Space for testing pump
Farm equipment building		

STAFFING PLAN

I. The National Agricultural Extension and Training Service Center

POSITION	NUMBER
Director	1
Secretary	2
Financial Officer	2
Material Officer	2
Technician	3
Worker	15
Doctor of Philosophy in Audio Visual Media	1
M.P.A.	2
Master of Arts in Audio Visual Media	1
Master of Arts in Communication Media	1
Master of Arts in C.D.	3
Master of Science in Agriculture	3
Master of Science in Training	3
Bachelor of Arts in Mass Communication	1
Bachelor of Arts in Programming	1
Bachelor of Arts in Engineering	2
Bachelor of Science in Extension	2
Bachelor of Science in Agriculture	3
Certificate in Printing	3
Certificate in Mechanic	2
Certificate in Photograph	2
Certificate in Arts	2
Certificate in Electronic	5
Certificate in Agriculture	2
Technician	5

II. The Agricultural Machinery and Equipment Center

POSITION	NUMBER
Director	1
Deputy Director	2
Unit Head	4
Assistant Unit Head	4
Secretary	1
Bookkeeper	2
Typist	7
Clerk	9
Telephone operator	1
Procurement Officer	2
Librarian	2
Statistician	2
Computing Technician	2
Electronician	3
Electrician	2
Draftsman	6
Plumber	2
Machinist	5
Technician	19
Photographer	1
Laboratory Helper	4
Messenger	2
Janitor	8
Driver	6
Night watchman	2
Laborer	20

5-4 SITE PLANNING

The National Agricultural Extension and Training Service Center

The main approach is planned to be located about 100 meters to the west of the Kamphaengsaen Campus service entrance on the opposite side of the Chon Pratan road.

A central mall with a large pond attached will be created at the wide space immediately behind the main gate, with the main circulation route surrounding this area.

The extension and training facilities, which consist of administrative building, audio-visual media center, printing shop and classroom building, will be arranged to face this main route.

To the east of the mall will be located a sports area, followed by dormitory units. The dormitories are separated from the administrative building and training facilities, so as to keep the residential nature of the environment for the dormitory area.

There will be a separate road approaching the dormitory area running from the public thoroughfare on the north side to make it possible for isolating the dormitory from the rest of the Center.

. The Agricultural Machinery and Equipment Center

The main approach to the Center will be from the main service road on the east side of the construction site. On the south side of the approach road will be located the administrative building. The workshop, and testing and research laboratory buildings will be located further inward from the main service road, and opposite to each other with a paved outdoor open space in between. The farm equipment building is located near the inner ends of the workshop and testing and research laboratory buildings. This plan may have to be changed in order to preserve the existing trees following a survey of the construction site to be made by Kasetsart University.

5-5 FACILITIES

5-5-1 The National Agricultural Extension and Training Service Center

. Administrative Building

The administrative building will provide space for administrative work necessary for smooth functioning of the Center. It consists of a director's room, deputy director's room, administrative offices, specialists' room, conference room and document and miscellaneous storage. It is planned as an RC structure of single-storeyed construction with a middle corridor so that rooms, and offices within it will be located on either the south and north side to ensure adequate natural lighting for each room.

. Audio-visual Media Center

Audio-visual media center is planned as an RC structure of two stories. All rooms on the first floor that are related to the TV studio are planned to be removed far from the passage from other buildings so as to minimize disturbance by noise. This is a countermeasure for sound and vibration proofing. The TV studio, provided with sound-absorbing equipment for reverberation control and echo prevention, is planned with one room of about 150 m² and related various rooms and equipment, which should be sufficient for normal practical use. Other parts of the first floor are planned to be used for storing the audio-visual materials that are intended for loan. On the second floor, administrative offices, a production room for educational audio materials, a production room for 16-mm educational films and a U.H.F. broadcast installation room for future use, are planned for. In planning out each of these rooms, careful consideration is also given to future installation of corresponding equipment.

. Printing shop

Various rooms for printing are planned within an RC structure of one storey. Printing machines that are commensurate with the center's research capacity are planned on the basis of the data on the types, kinds and volume of materials to be printed, submitted by Kasetsart University.

. Classroom Building

The classroom building is planned as a two-storeyed RC structure.

An auditorium with a capacity of 300 persons intended primarily for use as lecture hall shall be provided with fixed seats in a part of the room. Projection equipment, audio-visual equipment with a remote control system for 16-mm film and slide projection are also planned for.

On the second floor, six classrooms with a capacity of 60 persons each are planned. Audio-visual equipment is not planned for these rooms but the necessary facilities to set up such equipment will be provided.

In addition, a discussion room and training room are also planned for this building.

. Canteen

A space capable of accommodating a maximum of 150 persons at one time shall be provided. The kitchen equipment will be sufficient to handle 450 persons over 3 shifts.

. Dormitory

Dormitory is planned as a multi-storeyed, RC structure. The total number of residents that can be admitted in the dormitory shall be more than 300. Twin rooms with

bath for guest and Japanese expert for short time staying, rooms with shower for guest and officer, and large rooms for popular use are also planned for.

In addition, there will be a lunchroom for guest, living room for meeting, laundry room for lodger, etc., are planned for.

5-5-2 The Agricultural Machinery and Equipment Center

. Administrative Building

The administrative building is planned as a two-storeyed, RC structure.

On the first floor will be located the administrative office and lecture room with provision for accommodating small tractor and other types of agricultural machinery and equipment for educational purposes.

On the second floor will be located offices for fabrication research personnel as well as testing and service personal are planned for.

. Workshop, and Testing and Research Laboratory

These buildings are planned as a one-storeyed, steel structure. On the floor, slots shall be buried and fixed at pre-determined intervals for holding materials during testing, repairing, etc. Floor strength will be made sufficient for supporting large-size machinery equipment, trailer, etc.

In each building, an electric crane capable of handling a rated load of 5 tons shall be set up to cope with the need in transferring heavy materials within the building as well as carrying materials into and out of the building. At least the materials needed for proper maintenance of the necessary machinery and equipment and testing study shall be provided and piping for compressed air shall be installed as necessary.

5-6 ARCHITECTURAL PLANNING

In designing the buildings, the following points were considered:

. Natural Conditions

The design was prepared in such a way that the buildings would match with the prevailing climatic conditions in Thailand. For adequate ventilation buildings were set up on the east-west axis.

Connections between adjacent buildings were so planned that convenient access to one building from the other would prevail even at the time of rain.

. Construction Technique

To facilitate easy maintenance after the completion of the construction, the building materials, such as column-beam frame and bricks or blocks that are easily available locally will be employed.

5-7 MATERIAL PLANNING

The major building materials selected from those that are easily available locally.

. Structure Materials

Structure is mainly Reinforced Concrete framework with brick and concrete block wall. However, for parts of the workshop and Testing and Research Laboratory, steel frames are used. The cement, aggregate, sand, block, reinforcing bar, and steel frame to be used are those that are manufactured locally.

. Exterior Finish Materials

Roofs will be covered by cement tiles and corrugated asbestos cement sheets will be installed on roof slab, with loft air layer being utilized for heat insulation. Fittings that are made of wood, steel or aluminum will be those that are manufactured locally. Materials for exterior walls will be those that are in common use in Thailand, such as, washed terrazzo finish.

. Interior Finish Materials

The interior finish materials are planned in accordance with the intended use of each room. For floor materials, vinyl sheets will be used for general classrooms and office-rooms, polished terrazzo finish for corridor and mortar hardener finish for workshop and laboratory. Use for carpet is considered for parts of office rooms, conference rooms, dormitories, etc.

The wall finish will be a paint finish on mortar foundation. Some of the interior partition are movable partition that can be changed as necessary in the future. Every room that is intended for operation practice is paint finished directly on concrete blocks. For the most parts, the ceiling finish is made up of naked sound-absorbing materials, and for certain parts such sound absorbing material will be provided with spray finish.

5-8 STRUCTURAL PLANNING

. Basic principle

Thailand, which is outside of the main seismic zones of Asia, has rarely experienced earthquake. As for forces from wind, the average and maximum wind velocities are 1.5-2.1 m/sec. and 28.3 m/sec, respectively. Thus, the horizontal forces on building are seen to be extremely small so that in structural planning of single-storied or two-storied buildings, it is unnecessary to provide any special frames against horizontal forces.

Building structure, except roofs of large span framework of structural steel construction, is reinforced concrete structure. In addition, expansion joints will be appropriately prepared to prevent damage from irregular settlement of buildings or concrete shrinkage. The ground at the site planned for construction consists of alternate layer of clay and sand, and bearing capacity of the soil increases gradually with depth. However, there is no clearly defined supporting layer. On the basis of the scale of the buildings, to be constructed, pile foundations shall be generally employed with the sand layer at the depth of 12m~15m from the ground surface as a suitable ground support. For lightweight building such as circulation space, etc., a direct foundation shall be employed in accordance with the stability of the earth filling.

. Design principle

Structure design of the facilities is carried out on the basis of the observation obtained with the Central Laboratory and Greenhouse Complex in accordance with the various Japanese standards.

The external forces and the loads to be considered for the buildings to be constructed are as follows:

1) Dead load

The fixed weight of buildings (structural components, finishing materials, etc.) shall be calculated.

2) Live load

In principle, the values specified in the Building Standards Law of Japan will be adopted, but for special rooms such as machinery rooms, storage rooms, etc., the actual values will be calculated. The live loads for the major rooms are as follows:

(kg/m²)

	Floor slab	Column, beam and foundation
Classroom	230	210
Meeting room (Fixed seat)	300	270
(Unfixed seat)	360	330
Office	300	180
Dormitory	180	130
Staircase, corridor	360	330

3) Wind pressure forces

In accordance with the Japanese Control of Construction of Building Act, horizontal forces of 100 kg/m² will be considered.

4) Seismic forces

There is no need to take seismic forces into consideration.

Structural materials

Each structural material shall be selected on the basis of scale of building, type of structure and usage of the building, quality of local material, local supplying capability for the material, method of construction, and transportation facilities and cost, etc. However, the following materials are considered suitable.

1) Concrete

Normal concrete with a strength of F28 - 210 kg/cm² will be used. The concrete will be prepared at the construction site and its strength will be tested before use. The concrete will be mixed to a stiff consistency, with appropriate care during curing, such as sprinkling, etc. after pouring the mixed concrete into place.

2) Reinforcing bars

In general, SD 40 will be used. However, for small bars, SD 30 will be employed.

3) Piles

Pre-stressed concrete piles will be employed. The bearing capacity about 40 tons for such pile of 35-cm square shall be used. Materials in paragraphs 1), 2) and 3) are sufficiently available locally.

4) Structural steel

A construction method, in which steel frames of SS41 quality fabricated in Japan and erected through simple assembly at the site, is desirable.

5-9 AIR-CONDITIONING AND VENTILATION SYSTEMS

A - Air Conditioning System

The area for which conditioning has been requested by Kasetsart University covers a floor space of approximately 4000 square meters in the National Agricultural Extension and Training Service Center and about 650 square meters in the Agricultural Machinery and Equipment Center. The rooms to be air-conditioned are primarily those to be used as TV studios, classrooms, main administrative offices, and a part of the guest rooms in the dormitory.

In designing for air conditioning an outdoor temperature of 40 degrees Centigrade and a relative humidity of 80 - 90 percent were assumed.

Air-conditioning is planned as a separate type, cooling package system with zoning for each room or use. The main part of air conditioning equipment is to be imported and the other accessories, spare parts are provided locally.

B - Ventilation System

As a rule, natural wind draft will be utilized for ventilation for the various buildings included in this plan. However, forced ventilation will be used for certain rooms, such as lavatories, kitchen, conference rooms, etc.

5-10 PLUMBING SYSTEM

A - Water Supply System

- . The National Agricultural Extension and Training Service Center

Pipes would be installed by the Thai authorities from the existing main water line on the campus up to the construction site, crossing the public road with a capacity for supplying water at a rate of approximately 110 cubic meters per day."

Since water from the available water supply on the campus is quite hard, it will be distributed to the various locations after being softened by water-softening equipment.

The water receiving tank will be capable of holding at least a one day supply of water and will be set up out of doors. The water pump will be capable of satisfying the maximum instantaneous water supply, and sufficient pressure for the required lifting is secured.

Two pumps will be installed. These will be operated automatically on an alternating basis. Zinc plated steel pipes manufactured in the locale will be used as the water piping materials. The water softening equipment and the various valves needed in the system are to be imported.

. The Agricultural Machinery and Equipment Center

A main water line is already in existence along the main service road on the east side of the construction site. Water will be supplied to the Center from this line. The water will be distributed to the various areas in the Center after it has been passed through water softening equipment. The materials for the piping as well as equipment for this Center will be the same as those for the National Agricultural Extension and Training Service Center.

The amount of water required by this Center is approximately 45 cubic meters per day.

B - Drainage System

The drainage system for this project can be classified broadly into four categories, namely, sanitary sewage system, rainwater drainage system; experiment waste water drainage system; and miscellaneous waste water drainage system. The head of the discharge will be a waterway prepared by the Thai Authorities.

1) Sanitary Sewage System

Sanitary sewage from lavatories of the various buildings will be conveyed to external septic tanks. After going through the purifying process in such tanks, it will be combined with the miscellaneous drainage and discharged. Septic tanks will be set up for each of the buildings, and the plan tries to limit the sanitary sewage piping to the shortest possible length. The piping material for the indoor portion will be cast iron, while that for the outdoor portion will be centrifugal concrete pipes. In both cases, locally manufactured products will be used.

2) Miscellaneous Drainage System

Miscellaneous waste water from each of the buildings will be piped into open ditches located outdoor. The piping material for the indoor portion will be zinc plated steel pipe, while that for the outdoor portion, will be Hume pipes. In both cases, locally manufactured products will be used.

3) Rainwater Drainage System

Rainwater from roof of the various buildings and that collecting on the ground inside the site will be handled in the same way as the miscellaneous drainage. Open ditches of adequate capacity surrounding the site will be used to cope with the large amounts of rainwater drainage normally anticipated during the rainy season.

4) Experiment Waste Water Drainage System

Waste water from various laboratories will include oil from the Agricultural Machinery and Equipment Center. After being passed through an oil separator, it will be combined with the miscellaneous drainage and discharged as previously stated.

C - Sanitary Fixtures

Sanitary fixtures will be installed in the lavatories and other locations in the various buildings in accordance with the architectural plans. As far as toilet fixtures are concerned, those in the dormitory will be in local style and installed in a total of 15 rooms, each room being designed for the use by 12 persons. All other toilet fixtures will be western style.

All of the sanitary fixtures are to be of local manufacture, except faucets which will be imported.

D - Septic Tanks

The majority of septic tanks found in Thailand are of Thai style. However, recently a change toward prefabricated aeration-type tanks made from FRP has begun to take place. In this plan, aeration septic tanks will be used for each building, in which purification of sanitary sewage will take place.

E - Gas Supply System

This project envisions the use of liquefied petroleum gas (LPG). Supply of gas to the various buildings will be provided through either small gas cylinders or gas concentrative apparatus.

5-11 ELECTRICAL SYSTEM

A - Main Electrical System

1) Power Station Facilities

For the supply of electricity to the National Agricultural Extension and Training Service Center, the Thai authorities will extend the existing power transmission line from the Campus to the north boundary of the Construction site. From these points, the Japanese side will install a 3-phase, 3-wire 22 KV cable to an outdoor transformers to be set up for the Center by the Japanese side. Connections will then be made to the various loads from the transformers located on a pole outside the building after the power is stepped down to 3-phase, 4-wire, 380V/220V.

Power for the Agricultural Machinery and Equipment Center shall be led in via a 22 KV distribution line branching from the existing power transmission line on the campus to a lead in pole through the air. Connections will then be made to the various loads from a transformer located on a pole outside the building after the power is stepped down to 3-phase, 4-wire, 380V/220V.

The pertinent equipment include the following:

- . For the buildings
 - (1) Lighting; sockets
 - (2) Power for the airconditioning and ventilation equipment
 - (3) Power for the water supply and drainage facilities
- . For the extension and training equipment
 - (1) Power for the audio-visual equipment
 - (2) Power for the printing facilities
 - (3) Power for the TV studio

. For the agricultural machinery and equipment

(1) Power sources for the various equipment

It is anticipated that the National Agricultural Extension and Training Service Center will require a total capacity of about 750 KVA, and the Agricultural Machinery and Equipment Center about 250 KVA.

2) Power Generator Equipment

In order to assure the supply of power in case of a failure in the commercial power supply, an independent power plant consisting of stationary, indoor-type diesel engines will be set up. These will upgrade the reliability of the power supply.

The loads for the generators will be as follows:

- . Power for the well; the pump and its accessories
- . Power for motion pictures and the refrigeration facilities for film storage
- . Power for future transmitting facilities
- . Power for testing of agricultural machinery and equipment

Fuel for the generators will consist of CC light diesel oil.

The voltage will be 3-phase, 4-wire, 380V/220V 50 Hz.

The system to be set up for the National Agricultural Extension and Training Service Center will have a capacity of about 100 KVA, while that to be set up for the Agricultural Machinery and Equipment Center will have a capacity of about 50 KVA.

The system is designed so that it will be possible to switch the power source automatically.

3) Power Circuit System

a) Main Power Line

Outdoor type low-voltage switchboards will be installed close to the transformers. From there, underground lines will be run to the buildings. Within each building, low voltage power will be supplied by conduit wiring.

The main line system is as follows:

- . Main line for general lighting
..... 3-phase, 4-wire; 380V/220V lighting
- . Main line for air conditioning, ventilation, and plumbing systems
..... 3-phase, 4-wire; 380V
- . Power source for equipment
..... 3-phase, 4-wire; 380V/220V

b) Telephone Trunk Line

A junction box for telephone use will be set up in each of the central administrative offices. A route is planned as far as the MDF board to lead the on-campus telephone trunk line already set up by the University authorities to the construction site via an underground conduit. In addition, conduits are also planned as far as the terminal boards within the individual buildings. These conduits will run from the telephone junction box.

Equipment installed by the University will be used for the switchboard, and extension circuits will be connected.

B - General Electrical System

1) Power Facilities

Power supply work shall be carried out for the operation and control of the air conditioning, ventilation, water supply and drainage systems of each of the buildings as well as for the various kinds of machinery and equipment.

Individual power supply work will be performed for the television program unit, the motion picture unit and the printing machines.

2) Lighting Equipment

Illumination will be supplied primarily through fluorescent lighting. The lighting fixtures will be concealed in the ceilings or directly fitted. The circuits will have such configuration that lighting can be switched on or off in groups. In the television studio, dimmers will be installed as part of the work for equipment. Simple dimmers are also to be provided in certain rooms, such as, lecture halls, where there are provisions for showing motion pictures.

The illumination for the principal rooms will be roughly as follows:

- . For offices and conference rooms 300-400 lx
- . For classrooms 400 lx
- . For corridors and halls 100-150 lx
- . For laboratory and workshop 300 lx

3) Receptacles

Plug type receptacles will be installed in the required points in each building in order to supply power.

The wiring work will conform to JIS-IV and conduits will be used.

Power will also be adequately supplied to the necessary equipment.

4) Wiring system for lighting

Distribution boards will be set up in locations which allow easy maintenance and inspection.

Circuit breakers for wiring will be of the no-fuse type, and a bipolar system will be used. In addition, the circuits for lighting and those for power receptacles will be separated.

5) Wiring System for Telephone

Telephones will be installed in rooms that require them and necessary wiring will be provided to connect the telephones to the IDF board of each building.

Approximately 50 telephones are to be installed in the National Agricultural Extension and Training Service Center, and about twenty in the Agricultural Machinery and Equipment Center.

6) Public Address System

An amplifier to be used for all buildings of each Center will be installed at the central administrative offices in order to allow the announcement of necessary messages, the start and conclusion of work and other notices.

The necessary wiring will be provided in the classrooms so that at some time in the future it will be possible to install the equipment for individual public address systems.

7) Interphone System

Interphone facilities are included in this project to allow communications among the principal rooms within each Center.

8) Fire Alarm System

For each Center, there will be a fire alarm system which will enable the sounding of a bell by manual operation in order to convey an alarm to those being present in each of the buildings as soon as possible to facilitate evacuation on occurrence of fire.

9) Lightning Arrestor

Lightning arrestors employing radio isotopes will be installed at the highest part of each of the buildings in order to prevent accidents during storms that are accompanied by thunder and lightning.

10) Outdoor Lighting

Outdoor lighting will be installed on the routes leading to the main building within the construction site for night-time security purposes. Wiring for this system will be installed by means of underground cables, and an automatic on-off system using a timer will be provided in addition to regular manual switches.

5-12 EQUIPMENT PLANNING

5-12-1 The National Agricultural Extension and Training Service Center

The extension and training activities (using audio-visual aids), which are the principal purpose of the Center, are carried out by the following three major sections:

A - Audio-visual Media Section

- 1) Visual educational materials production section
 - . Television Program Unit for the production of videotape educational materials
 - . Motion picture Unit for the production of educational films
 - . Photography unit for the production of educational photo
- 2) Listening materials production section
 - . Audio Media Production Unit
- 3) Printing section
 - . Printing shop for the production of textbooks and other materials
 - . Graphics Production Unit for the production of posters and cards

B - Extension and Training Section

- 1) Broadcasting facilities
- 2) Mobile unit
- 3) Training facilities
- 4) Service unit

C - Administrative Section

Staff of the Extension and Training Division can be classified into a group whose principal sphere of activity lies within in-Center training, and a group that performs extension work in order for the Agricultural Extension and Training Service Center to be able to perform its functions effectively, the following types of equipment are apparently needed in various parts of Thailand.

I. In-Center Training Group

(A) Audio-visual Media Section

- a) Television program unit
- b) Audio media production unit
- c) Printing shop

(B) Extension and Training Section

- a) Training facilities
- b) Service unit

II. Extension Group

(A) Audio-visual Media Section

- a) Motion picture program unit
- b) Photography unit
- c) Audio media production unit
- d) Graphics production unit

(B) Extension & Training Section

- a) Broadcasting facilities
- b) Mobile unit
- c) Service unit

The facilities and equipment for training should be provided in the Center, and the training activities in the Center should be performed intensively to insure full use of such facilities and equipment.

In the selection of equipment, therefore, first priority was given to those equipment requiring installation during construction. This sort of equipment would include the automatic film developer to be used by the Motionpicture program unit. Next priority has been given to those equipment groups intended principally for In-Center training.

In other words, the present guide lines for equipment selection are as follows, taking the priorities requested by the Thai authorities into consideration.

1. Equipment which must be installed during construction
2. Equipment for groups whose principal purpose is for In-Center training
3. Equipment destined primarily for extension work

A) Audio-visual media section

(1) Visual educational material production section

This section includes the television program unit, motion picture program unit and photography unit, the planning is centered on the television program unit with special attention given to ease of operation and immediate playback of educational materials.

The local PAL system will be used, and the Japanese college studios have been chosen as the standard level for the equipment. The equipment included in this unit is assumed to provide sufficient operating possibilities in functional terms; it will include television cameras and lighting equipment, all of which will be centered around an audio-visual control console located in the control room. Included in the equipment composing these units are detailed items which do not belong to the buildings themselves; in the case of the studio, comprehensive adjustments will be necessary at the time of installation and, thus, a complete set of equipment for the unit is provided.

For the motion picture program unit, handling is more difficult than in the case of video educational materials, but when considered as an audiovisual media, it has many virtues which cannot be obtained with video systems. Then the automatic developer and its additional equipment are planned. With regard to the photography unit, dark room development equipment is planned for producing educational stationary image films, on the contrary to the motion picture films by the above two units.

(2) Audio Media Production Unit

Centered around a stationary mixing console to be used in the production of listening educational materials, this equipment will be of a scope allowing the production of most educational materials. The necessary peripheral equipment for the console will also be installed.

(3) Printing Section

The composition of the equipment to be provided in the printing shop is based on proposals by the Japanese side and will be capable of handling the expected volume of printing to be performed. Equipment which functions as a single unit has been selected.

The equipment in the Graphic Production Unit was eliminated due to the combination of individual items and machines unrelated to the construction.

B) Extension and Training Section

In relation to this section, only the auditorium, which is in the Center and is to be used for lectures, will be provided with equipment. This set of equipment will be that necessary for a remotely controlled audio-visual classroom and it will control the motion picture projectors, blackout curtains, etc. In line with this, the appropriate wiring and conduits will be provided architecturally. With regard to the AV service unit, facilities for utilizing the educational material are not sufficient in relation to the scale of the section for producing such material. Therefore, the AV equipment for lending is planned to secure high efficiency of utilizing the whole Center.

C) Administrative Section

The equipment in this section was also deleted as it consists entirely of separate measuring instruments which can be procured by the Thai authorities.

The extension and training activities which will be carried out using audio-visual aids are conceived of as a single system. Facilities such as those for the broadcasting facilities, and the mobile unit which could not be taken fully into account here are particularly important for the extension work of the Center. Therefore, the section related to the facilities deleted in the present case should be expanded by technical cooperation which will probably be scheduled in the future.

5-12-2 The Agricultural Equipment and Machinery Center

During discussions between the survey team and Kasetsart University officials, the following priority for equipment was presented by the Thai side.

- 1) Testing equipment centered on performance tests of agricultural machinery and equipment.
- 2) Mobile units for extension and training of agricultural machinery and equipment.
- 3) Maintenance equipment for the repair and fabrication of agricultural machinery and equipment.
- 4) Small tractors.
- 5) Large tractors.

Testing equipment is ranked first. This is reasonable since agricultural machinery and equipment that are suited to the land, climate, kind of cultivation, and people's living and working conditions must be developed or improved urgently in order to promote agricultural mechanization in Thailand.

Among testing equipments a torque dynamometer (electronic type) is listed first as a device for measuring torque transmitted by tractor PTO. However, this measuring device serves only to measure torque, and cannot measure the tractors output. Power of a tractor can only be measured by the combined use of a torque dynamometer and a loading device (power absorbing device).

Therefore, an electric dynamometer requiring no loading device is considered appropriate for measuring the tractor's PTO. An electric dynamometer can exercise remote control of load resistance including smooth change of load.

A fuel analyzer and an exhaust gas analyzer are used for high level research works in respective technical fields. Considering that two sets of such instruments cost much almost equal to the construction cost of the administrative building, there are many devices other than these instruments to be prepared at the present stage, though such precious instruments are not to be considered unnecessary for carrying on the development and improvement research works for agricultural machinery.

Devices necessary for various tests and research works are to be designed and manufactured to meet particular applications, since no ready made ones are available. The test devices owned by the universities and research institutes in Japan are designed and manufactured by researchers themselves or made partly with the aid of specialized manufacturers.

Testing equipment such as electric dynamometer, electric revolution counter strain gage have been selected after careful study of the kind, specifications, etc. of equipment necessary for conducting tests and research as described above.

With regard to the mobile units and tractors, kind and quantity of necessary agricultural machinery should be determined according to a detailed training curriculum laid out through discussions made with the

Japanese specialists after this Center is completed. Therefore, listing of equipment of this type is omitted from the equipment plan.

With regard to maintenance equipment, fixed-type, large-sized equipments which should be installed in the building during construction or after its completion are mainly planned. It is considered adequate that particular hand tools and measuring instruments be procured in accordance with the progress of the training curriculum. Thus machine tools such as milling, drilling and welding machines, as well as the equipment to be installed during construction such as generator, air compressor and high pressure pump are selected.

EQUIPMENT LIST

1. The National Agricultural Extension and Training Service Center

EQUIPMENT		QTY.	
Television Program Unit	1. Color TV Camera Equipment	(1) Color Camera (2) View Finder (3) Zoom Lens (4) Color Collector (5) Tripod with Dolly	2 2 2 2 2
	2. Test Chart	(1) Regist. Pattern (2) Gle-Scale	1 1
	3. Color TV Monitor with Waggon		1
	4. Microphone	(1) Directional Dynamic Microphone (2) Directional Condencer Microphone	3 2
	5. Microphone Stand	(1) Desk Type (2) Floor Type (3) Boom Type	5 3 1
	6. Mic Extension Cable (10 m)		6
	7. Speaker (for Studio)		2
	8. Outlet Connection Board		1 set
	9. Handy Camera (Outdoor Type)	(1) Camera Head (AC Power Supply Tripod) (2) Portable Cassette V.T.R.	1 set 1
	10. Audio Visual Control Console	(1) Console (2) Audio Mixer (3) Remote Control Panel & Switch Panel (4) Inter Come	1 1 1 set 1
	11. Tack for Equipment	(1) Cabinet Rack (2) Effective Generator (3) Output Switcher (4) Sync. Generator (5) Pulse Distributor (6) Pulse Delay System (7) Time Base Collector (8) Jack Board for Picture (9) Jack Board for Audio (10) AC 24V. Power Supply	1 1 1 1 1 1 1 1 1 1
	12. Telecine System	(1) Telecine Color Camera (2) 35 mm Slide Projector (3) 16 mm Film Projector (4) 8 mm Film Projector (5) Multi Plexer (6) Stand	1 1 1 1 1 1
	13. Monitor System	(1) Video Monitor TV (2) Color Monitor TV (3) Color Monitor TV (4) Picture Monitor (5) Tally Board	5 1 4 1 1
	14. Wave Form Monitor		1
	15. Vector Scope		1
	16. Test Signal Generator		1
	17. Oscilloscope		1
	18. Video Tape Recorder with Waggon (V.T.R.)		1
	19. Editing V.T.R. System	(1) Editing V.T.R. 3/4" Cassette Type (2) Editing Controller (3) Waggon	2 1 1

EQUIPMENT		QTY.		
	20. V.T.R. for Player	(1) V.T.R. (2) Color Monitor TV (3) Waggon	2 2 2	
	21. Monitor Speaker for Control Room		2	
	22. Tape Recorder with Waggon		1	
	23. Turn Table with Waggon		1	
	24. Head Phone		2	
	25. Announce Table		1	
	26. Voice Control for Announcer		1	
	27. Video Monitor for Announce Booth		1	
	28. Directional Moving Microphone		1	
	29. Mic. Stand		1	
	30. Monitor Speaker for Announce Booth		1	
	31. Connecting Board		1	
		32. Illumination System	(1) Light Control Board (2) I. Beam Rail (3) Moving Pulley (4) Hunging Pulley (5) Grid Pipe Bracket (6) Horizont Pipe (7) Curtain Rail (8) Curtain (9) Soft Light (10) Broad Light (11) Spot Light (12) Horizont Light (13) Spring Balance Hunger (14) Movable Stand (15) Consent Box (16) Light Operation Pole (17) Accessary	1 set 1 set 8 - 10 12 - 15 10 1 set 1 set 1 set 2 - 3 5 - 6 5 - 6 10 - 12 1 set 2 1 set 1 1 set
Motion-Picture Production Unit		1. 16 mm Film Color Positive Automatic Developer		1
		2. 16 mm Film Color Negative Automatic Developer		1
		3. Accessary		1 set
		4. Continuous printer for 16-mm. films		1
		5. Horizontal-type film editor		1
		6. 4-way friction winder with wooden base		1
		7. 4-way synchronizer with film shoulder for 16-mm. film		1
		8. Animation stand with camera for 16-mm. film		1

	EQUIPMENT	QTY.	
Photography unit	1. Enlarger and easel	7	
	2. Dark-room safety light	7	
	3. Twin lens reflex camera	7	
	4. Camera with 35-mm. range finder	7	
	5. Electronic flash	7	
	6. Contact proof prints	3	
	7. Print dryer	2	
	8. Print washer	2	
	9. Film dryer cabinet	1	
	10. Electronic slide duplicator	1	
	11. Copying set	1	
	12. B/W instant slide making set	-	
	13. 35-mm. SLR camera	2	
	14. Interchangeable lenses :		
		(a) Wide-angle 35-mm., F/2 lens	1
		(b) Telephoto 105-mm., F/2.5 lens	1
		(c) Telephoto 135-mm., F/2.8 lens	1
		(d) Telephoto 200-mm., F/4 lens	1
		(e) 43-86 mm., F/3.5 zoom lens	1
		(f) 80-200 mm., F/4.5 zoom lens	1
		(g) 55-mm., F/3.5 macrolens	1
		(h) 70-210 automatic zoom lens	1
		(i) 50-300 mm., zoom lens	1
		15. Electronic flash (Pro-type)	1
		16. Motor drive for 35-mm. SLR camera	1
		17. 2.1/4 x 2.1/4" single-lens reflex camera	1
	18. Half-frame camera (SLR type)	1	
	19. Enlarger for 35-mm.	1	
	20. Easel for paper sizes up to 11 x 14"	1	
	21. Dark-room timer	1	
	22. Spot light	2	
	23. Spot light (6" sweep-focus fresnel)	1	
	24. Photo lamp	2	
	25. Flood light	2	
	26. Set light	2	

EQUIPMENT		QTY.
Audio Media Production Unit	1. Audio Mixing Amplifier Console	2
	2. Turn Table with Console	2
	3. Open Reel Tape Recorder with Console	2
	4. Cassette Tape Recorder with Console	2
	5. Microphone with Stand	4
	6. Head Phone	2
	7. Monitor Speaker	4
	8. Tape Duplicator	1 set
	9. Cassette Tape Duplicator	1 set
	10. Accessary	1 set
Printing Shop	1. Photo Typesetting	2
	2. Automatic Direct Processor (A2 size)	1
	3. Automatic Direct Processor (B4 size)	1
	4. Offsset Press (21.5" x 21.5")	1
	5. Offsset Press (A3 size)	2
	6. Offsset Press (B4 size)	2
	7. Paper Guillotine	1
	8. Automatic Folder	2
	9. Book-Cover Binding Machine (45 mm)	1
	10. Stitching Machine (30 mm)	1
	11. Accessary	1 set
Auditorium	1. All Remote Control Board	1
	2. Lecture Control Table	1
	3. Wireless System	
	(1) Wireless Mic.	1
	(2) Tuner	1
	(3) Antenna	1
	4. Main Screen	1
	5. Sub Screen	1
	6. Variable Mask Curtain (only Rail & Driving Motor)	1 set
	7. Stage Curtain (only Rail & Driving Motor)	1 set
	8. Darken Curtain (only Rail & Driving Motor)	1 set
	9. 16 mm Film Projector with Stand	1
	10. Slide Projector with Stand	1
	11. O.H.P. with Stand	1
	12. Audio Control Console (Built in Turn Table, Tape Deck and Main Amp.)	1 set
13. Ceiling Speaker	6	
14. Main Speaker	2	
15. Movable Blackboard	1	

	EQUIPMENT	QTY.
A.V. Service unit	1. Wireless amplifier with built-in speaker in column, wireless microphone, 15-watt power output	4
	2. Two-channel wireless amplifier with built-in speaker, two wireless microphones, and 7-watt power output	2
	3. Megaphone (flashlight-battery operated)	4
	4. Public address system, i.e., mixing amplifier, 3 microphones, 2 horn speakers, record player, cassette tape deck, and 200 watt power output (r.m.s.)	2
	5. 16-mm. motion-picture projector with halogen lamp, induction motor and magnetic and optical sound reproduction	2
	6. Super 8-mm. motion-picture projector with halogen lamp and magnetic and optical sound reproduction	2
	7. 2" x 2" Slide projector with xenon lamp	4
	8. Overhead projector with halogen lamp and thermal switch	4
	9. Projection screen, size 70 x 70", portable, with stand	5

II. The Agricultural Machinery and Equipment Center

EQUIPMENT		QTY.	
Testing Equipment	1. Electric Dynamometer and Electric Revolution Counter	1 set	
	2. Equipment for Measuring Fuel Consumption	1 set	
	3. Hardness Tester	(1) Rockwell	1 set
		(2) Brinell	1 set
	4. Strain Gage	(1) Dynamic Strain Amplifier	1 set
		(2) Bridge Box	1 set
		(3) Low Pass Filter	1 set
(4) AC. Power Unit		1 set	
(5) Oscillograph		1 set	
(6) Strain gage		1 set	
(7) Accessories for Strain Gage		1 set	
(8) Gage Tester		1 set	
(9) Load Cell		8	
(10) Pressure Transducer		8	
(11) Displacement Transducer		5	
(12) Acceleration Transducer		7	
(13) Digital Indicator		1 set	
(14) Resistance Box		1	
(15) Signal Conditioner		1	
5. Temperature Meter	4 sets		
6. Device for testing characteristic for field sprayer	1 set		
7. Handy digital tachometer	1 set		
Machine-Shop Equipment	1. Milling Machine	1 set	
	2. Shaping Machine	1 set	
	3. Shearing Machine	1 set	
	4. Bending Machine	1 set	
	5. Radial Drilling Machine	1 set	
	6. Drilling Machine (38 mm ϕ , 16 mm ϕ)	2 sets	
	7. Band Saw	1 set	
	8. Grinding Machine	(1) 1.5 ps, 2,800 rpm	1 set
		(2) 5 ps, 1,500 rpm	1 set
	9. Air Compressor	2 sets	
	10. High Pressure Water Pump	1 set	
	11. Welding Equipment & Accessories	(1) AC. Electric Welder	4 sets
		(2) Oxy-Acetylen Welder-Cutter	2 sets
(3) Spot Welder		1 set	
(4) Aluminium Welder		1 set	
(5) Double-Bit Cleaner		12	
(6) Welding Glove		12	
(7) Fiber Glass Helmet		12	
(8) Standard Goggle		12	
12. Hydraulic Power Source	(1) Hydraulic Pumping System, 3000 psi	1	
	(2) Hydraulic System for turning soil bin and hydraulic test bench	1	
13. Maintenance Tool Set for minor repair	2		

6 PRELIMINARY DESIGN

LIST OF DRAWINGS

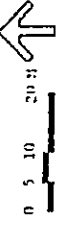
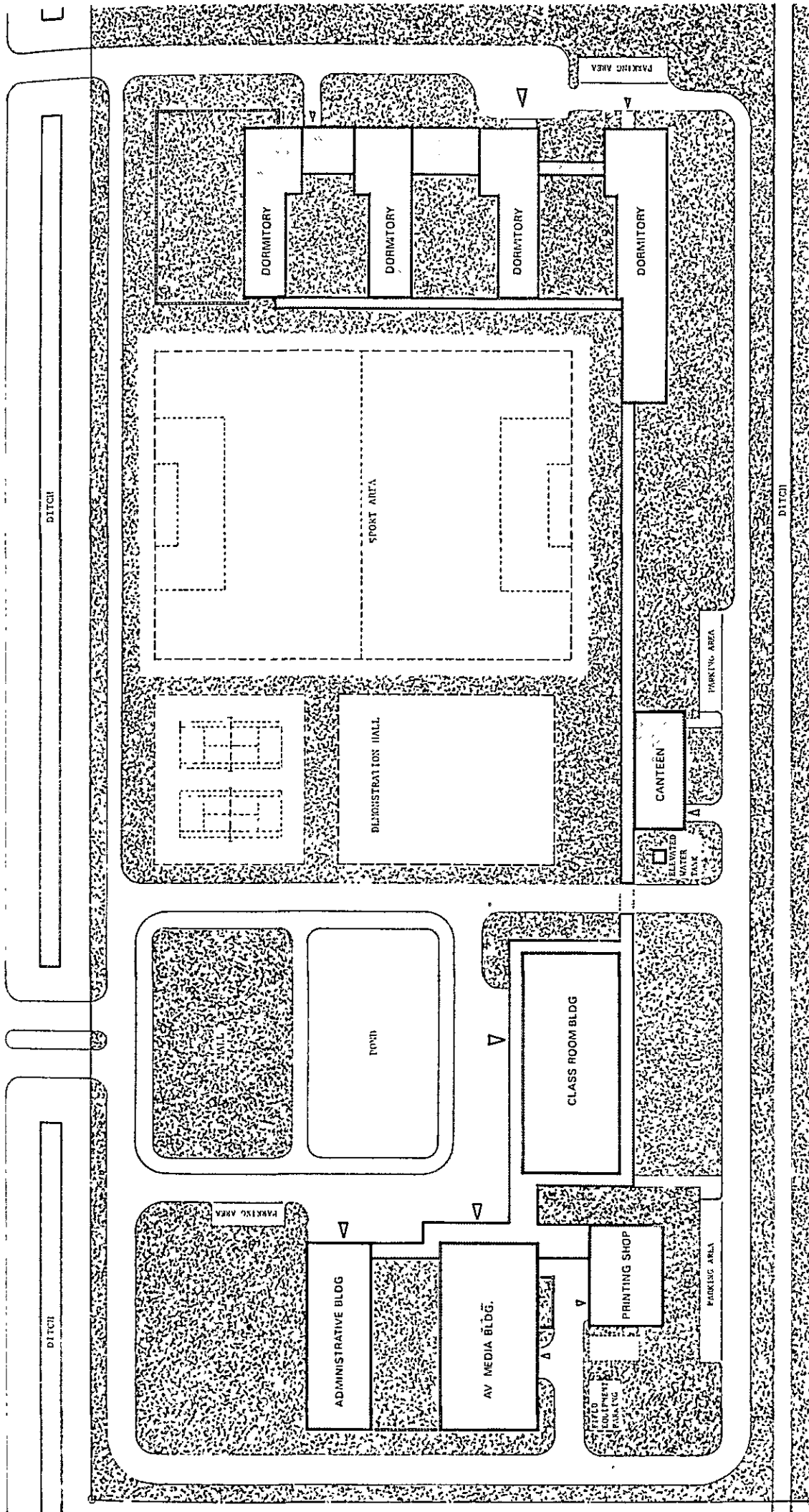
THE NATIONAL AGRICULTURAL EXTENSION & TRAINING SERVICE CENTER

01	SITE PLAN	
02	ADMINISTRATIVE BLDG. AV. MEDIA BLDG. PRINTING SHOP CLASSROOM BLDG.	1ST FLOOR PLAN
03	"	2ND FLOOR PLAN
04	"	ELEVATION & SECTION
05	CANTEEN	1ST FLOOR PLAN ELEVATION & SECTION
06	DORMITORY	1ST FLOOR PLAN
07	DORMITORY	2ND & 3RD FLOOR PLAN
08	DORMITORY	ELEVATION & SECTION
09	WATER SYPPLY SYSTEM	
10	DRAINAGE SYSTEM	
11	ELECTRICAL SYSTEM	
12	TELEPHONE SYSTEM	

THE AGRICULTURAL MACHINERY & EQUIPMENT CENTER

13	SITE PLAN	
14	ADMINISTRATIVE BLDG.	1ST & 2ND FLOOR PLAN ELEVATION & SECTION
15	WORKSHOP	1ST FLOOR PLAN
16	WORKSHOP	2ND FLOOR PLAN
17	WORKSHOP	ELEVATION & SECTION
18	WATER SUPPLY SYSTEM	
19	DRAINAGE SYSTEM	
20	ELECTRICAL SYSTEM	
21	TELEPHONE SYSTEM	

U. S. PAVY ROAD

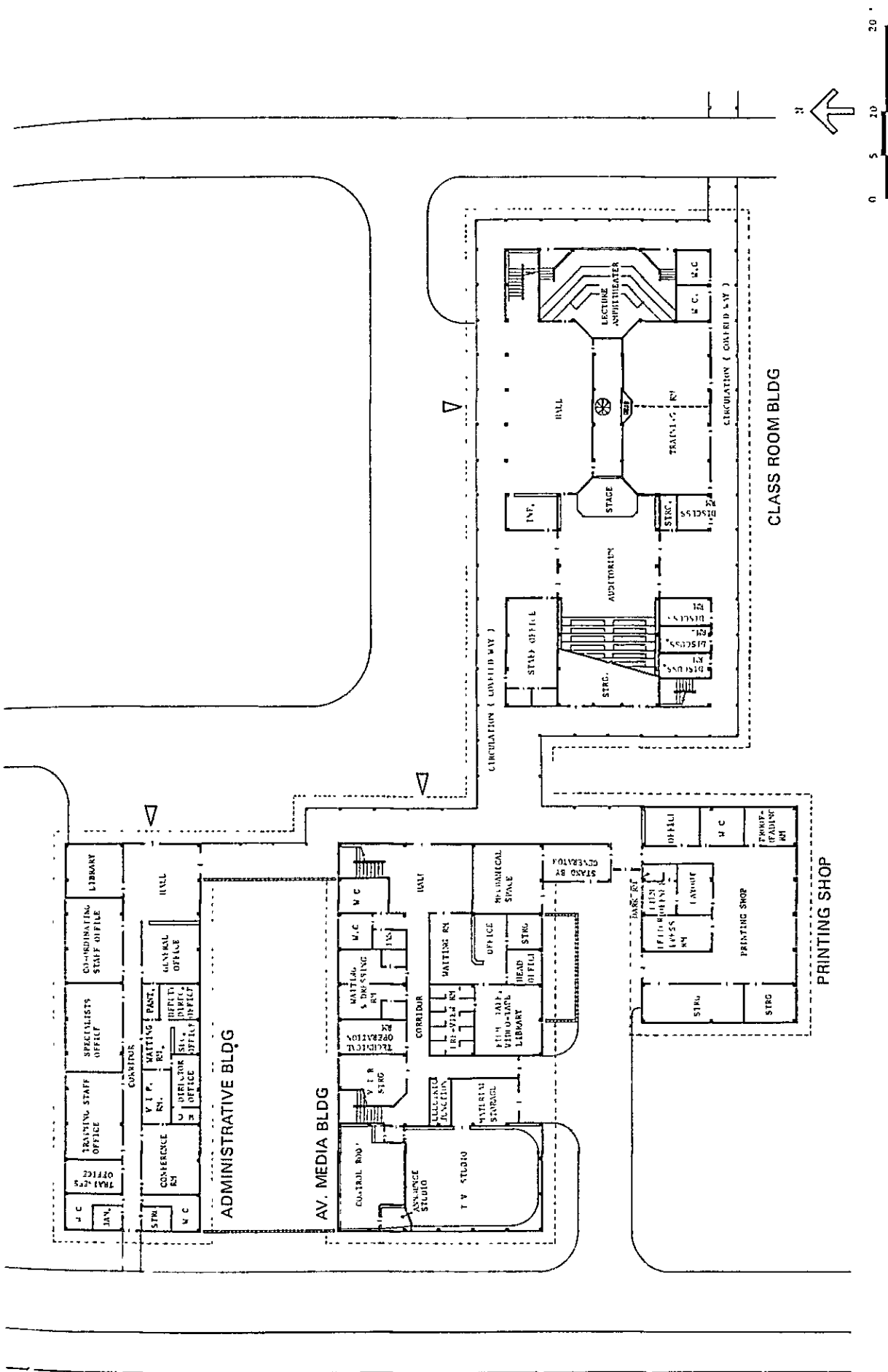


- LEGEND
- BUILDING TO BE PROVIDED BY JAPANESE SIDE
 - BUILDING TO BE PROVIDED BY THAT SIDE
 - BOUNDARY LINE

THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

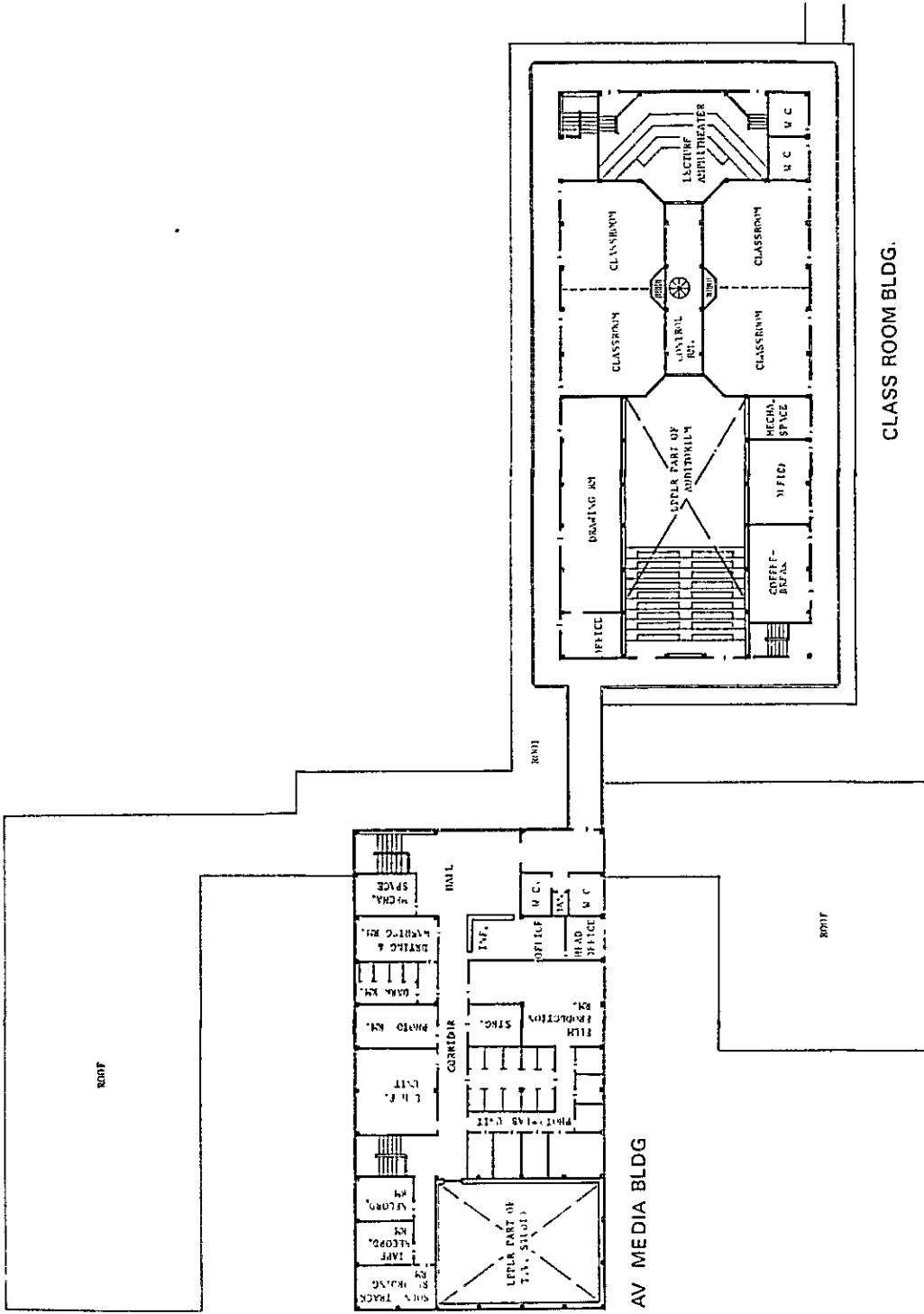
SITE PLAN

01

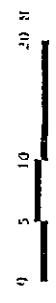


ADMINISTRATIVE BLDG.
 AV. MEDIA BLDG.
 PRINTING SHOP
 CLASS ROOM BLDG

THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER



CLASS ROOM BLDG.

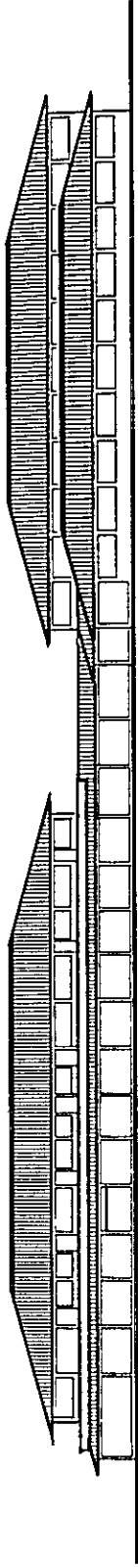


ADMINISTRATIVE BLDG.
 AV. MEDIA BLDG
 PRINTING SHOP
 CLASS ROOM BLDG.

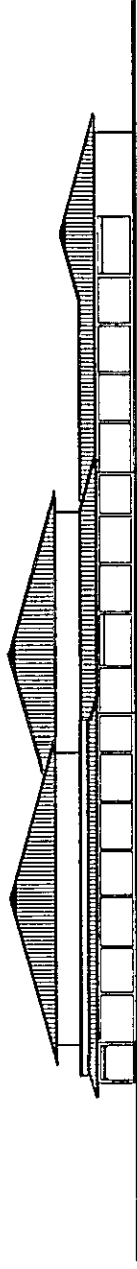
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2ND FLOOR PLAN

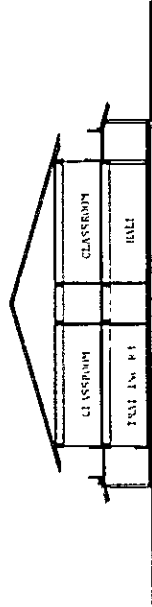
THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER



NORTH ELEVATION



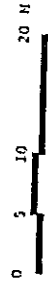
EAST ELEVATION



SECTION-1



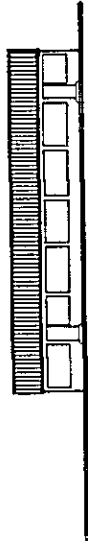
SECTION-2



ADMINISTRATIVE BLDG.
 AV. MEDIA BLDG
 PRINTING SHOP
 CLASS ROOM BLDG.

THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

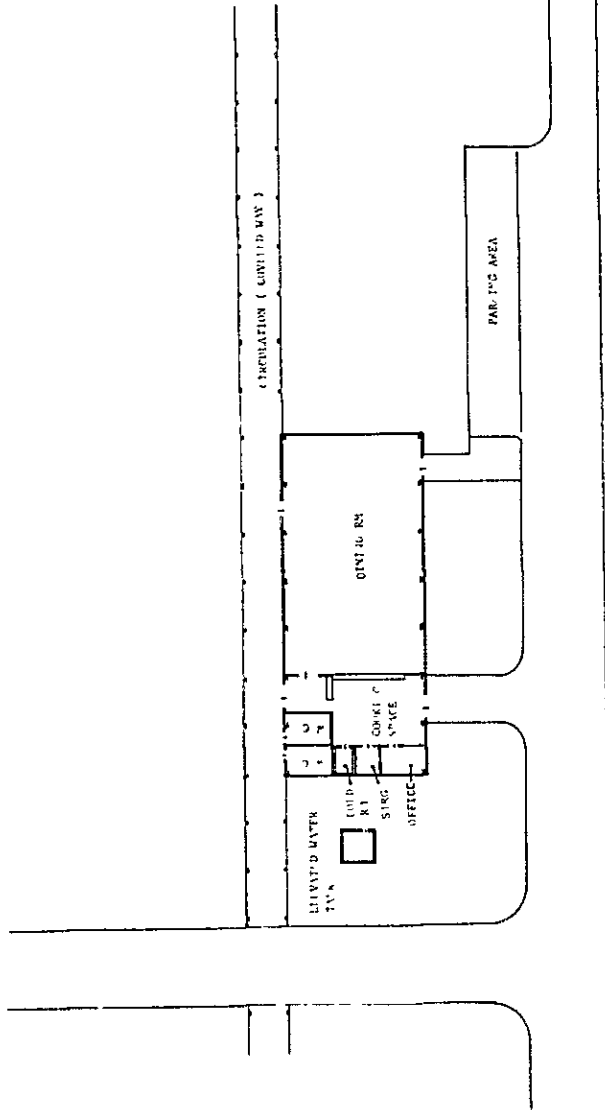
ELEVATION & SECTION



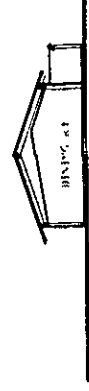
SOUTH ELEVATION



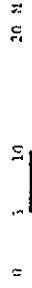
EAST ELEVATION

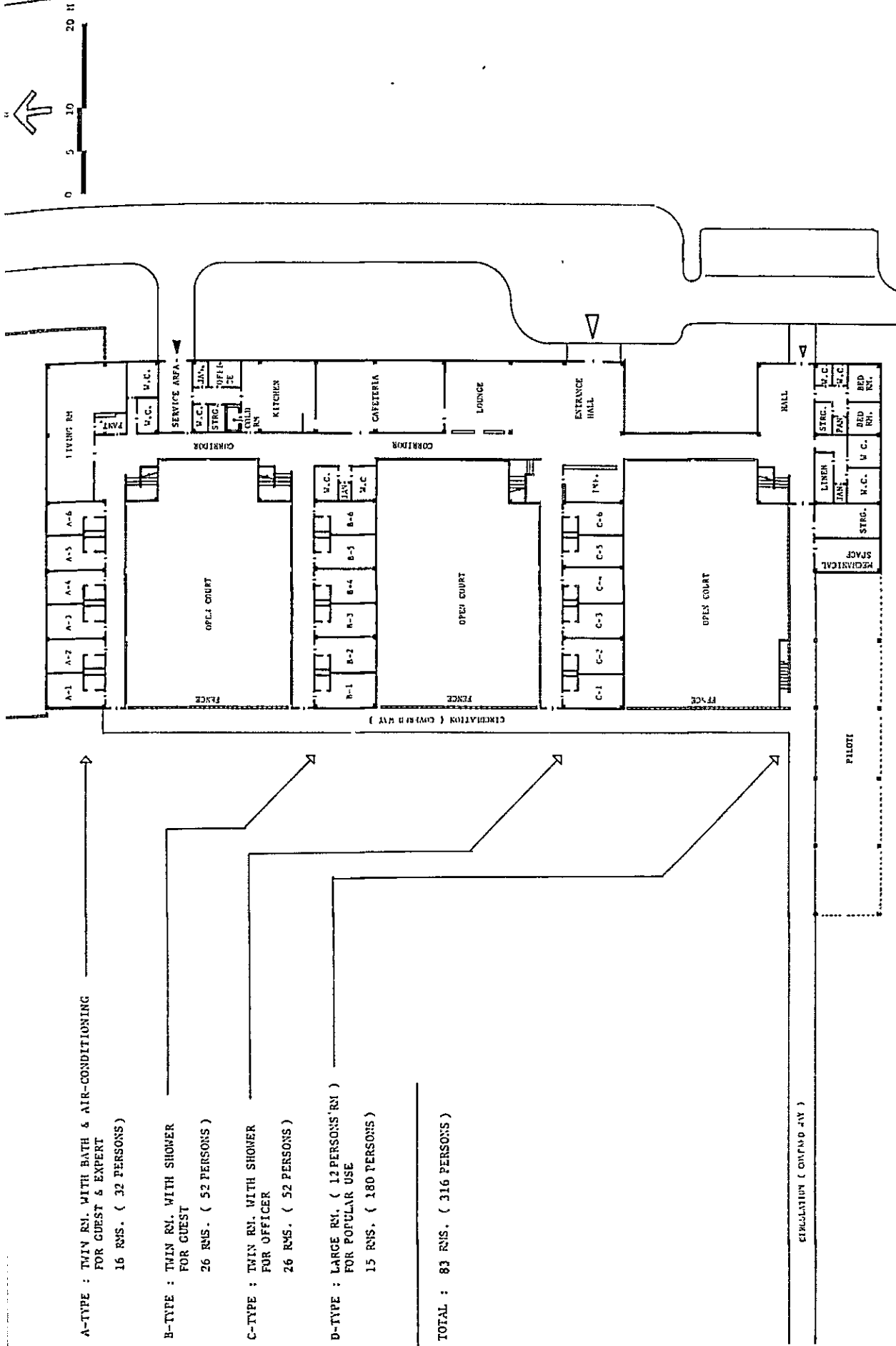


1ST FLOOR PLAN



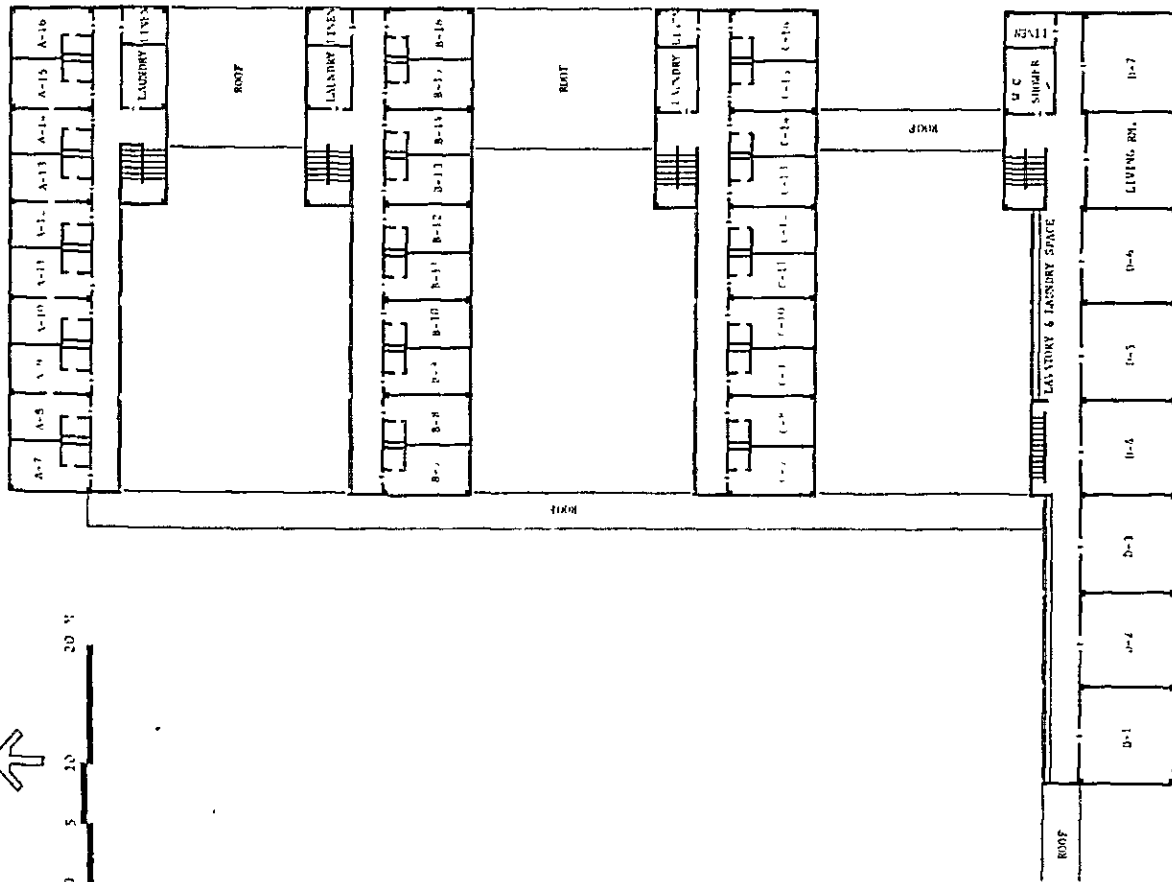
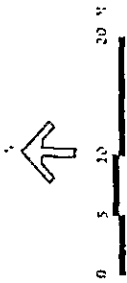
SECTION



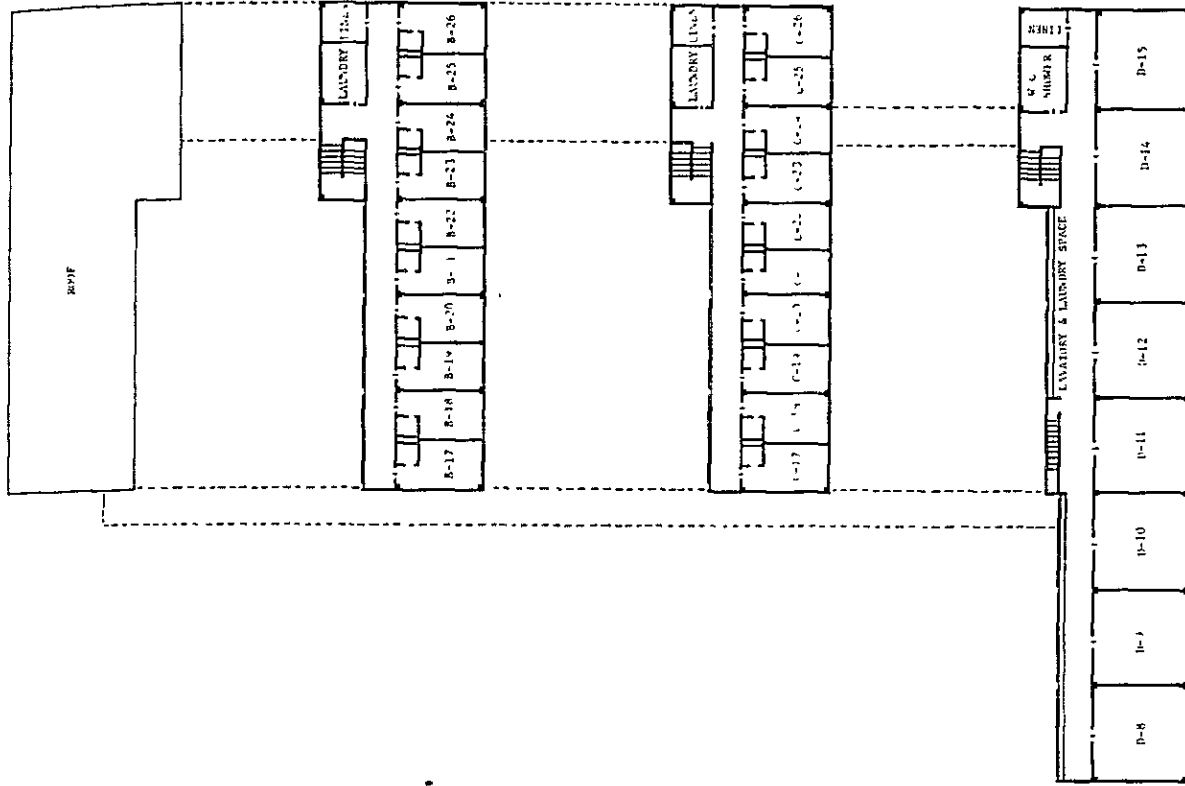


- A-TYPE : TWIN RM. WITH BATH & AIR-CONDITIONING FOR GUEST & EXPERT
16 RMS. (32 PERSONS)
 - B-TYPE : TWIN RM. WITH SHOWER FOR GUEST
26 RMS. (52 PERSONS)
 - C-TYPE : TWIN RM. WITH SHOWER FOR OFFICER
26 RMS. (52 PERSONS)
 - D-TYPE : LARGE RM. (12 PERSONS' RM) FOR POPULAR USE
15 RMS. (180 PERSONS)
-
- TOTAL : 83 RMS. (316 PERSONS)

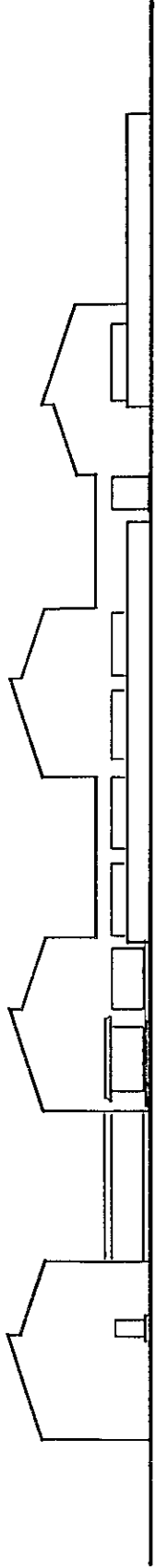
CIRCULATION (CONT'D. 24)



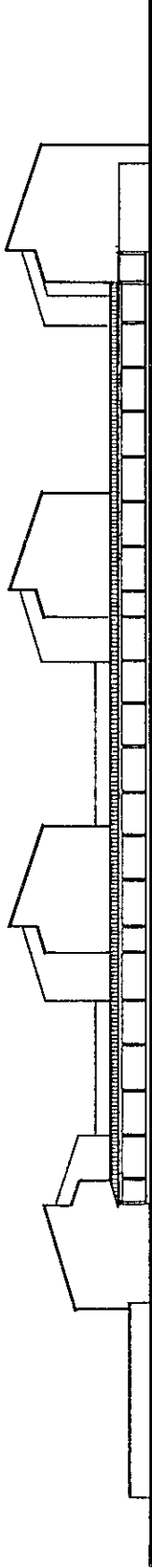
2ND FLOOR PLAN



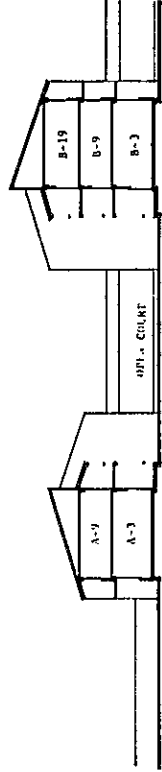
3RD FLOOR PLAN



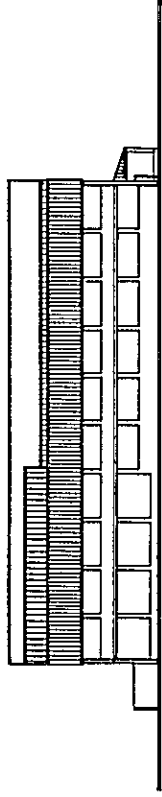
EAST ELEVATION



WEST ELEVATION

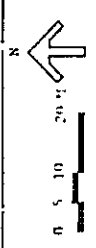
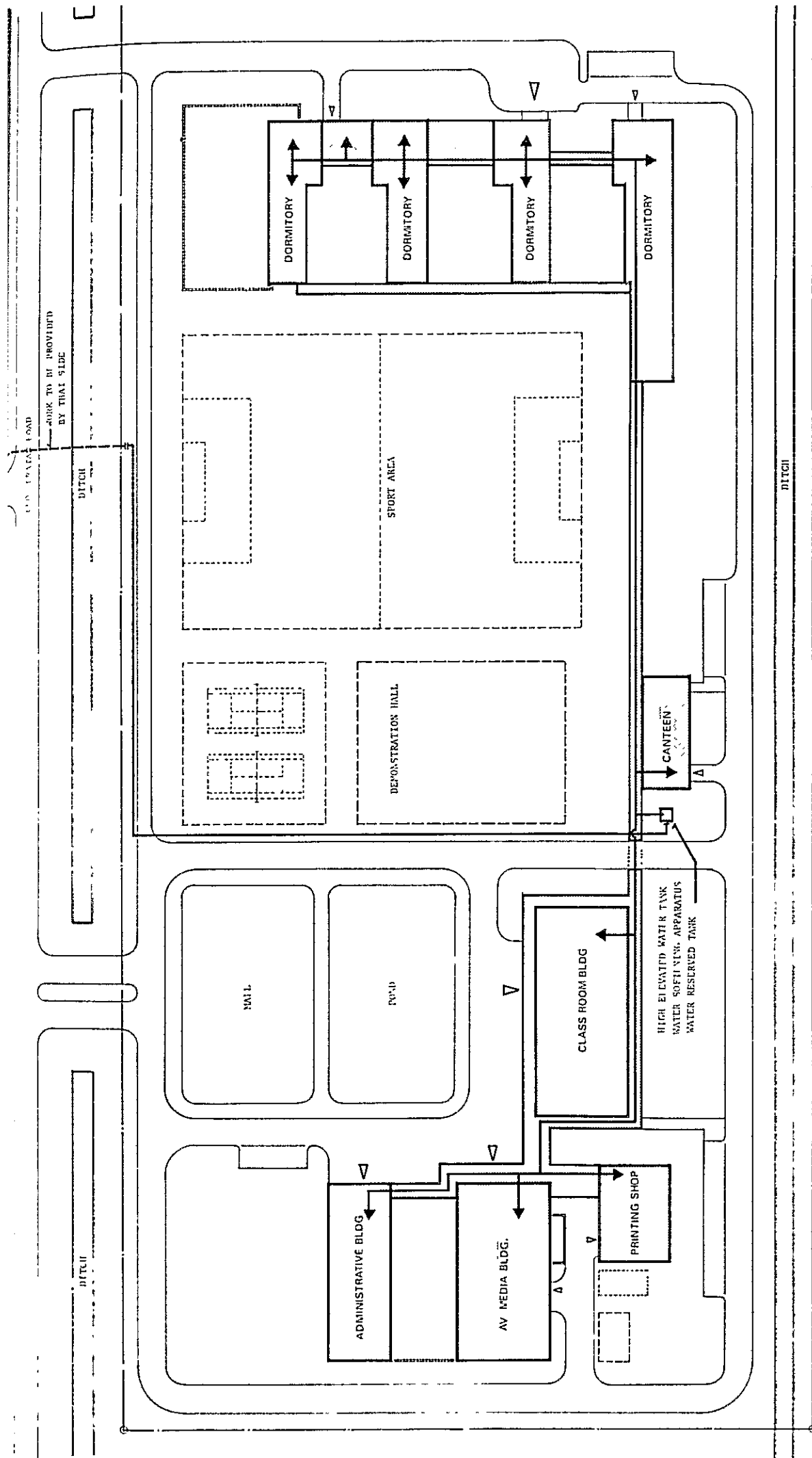





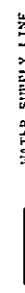
SECTION



NORTH ELEVATION



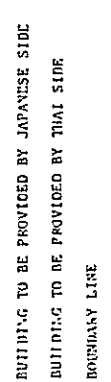
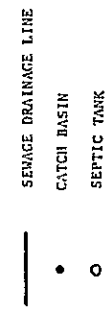
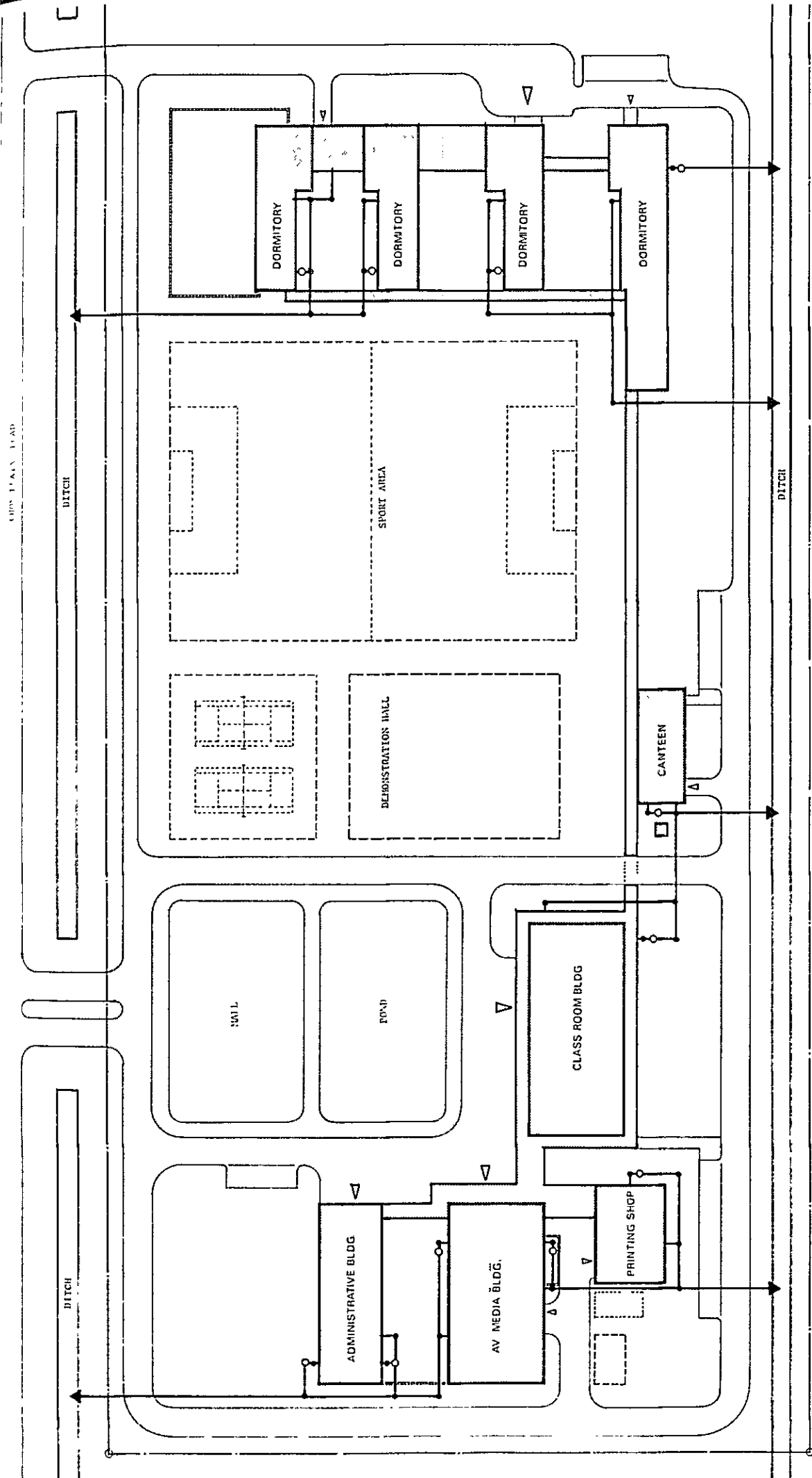


-  BUILDING TO BE PROVIDED BY JAPAN/AF SIDE
-  BUILDING TO BE PROVIDED BY THAI SIDE
-  BOUNDARY LINE
-  WATER SUPPLY LINE

09

WATER SUPPLY SYSTEM

THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER



1:1000

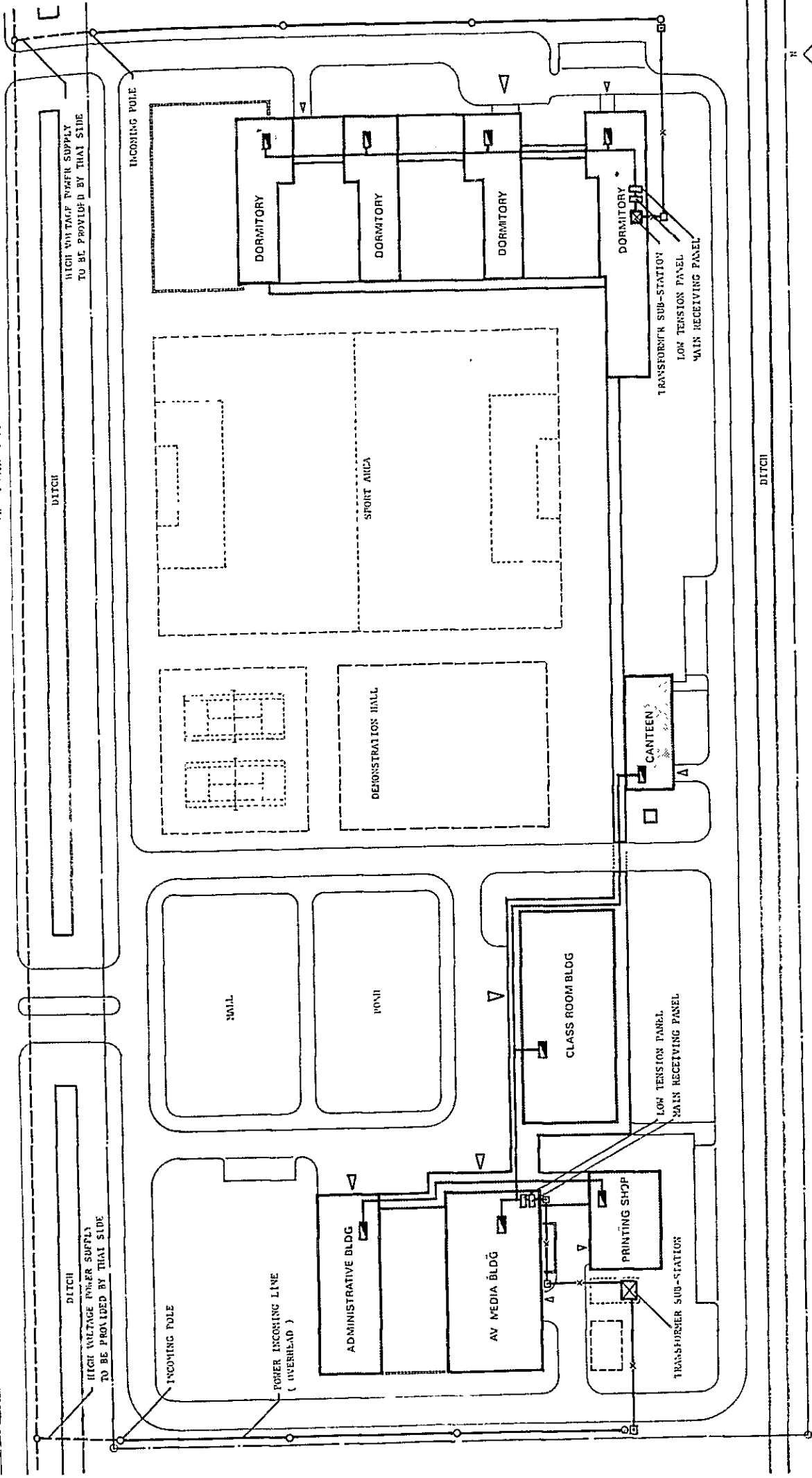
THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

DRAINAGE SYSTEM

10

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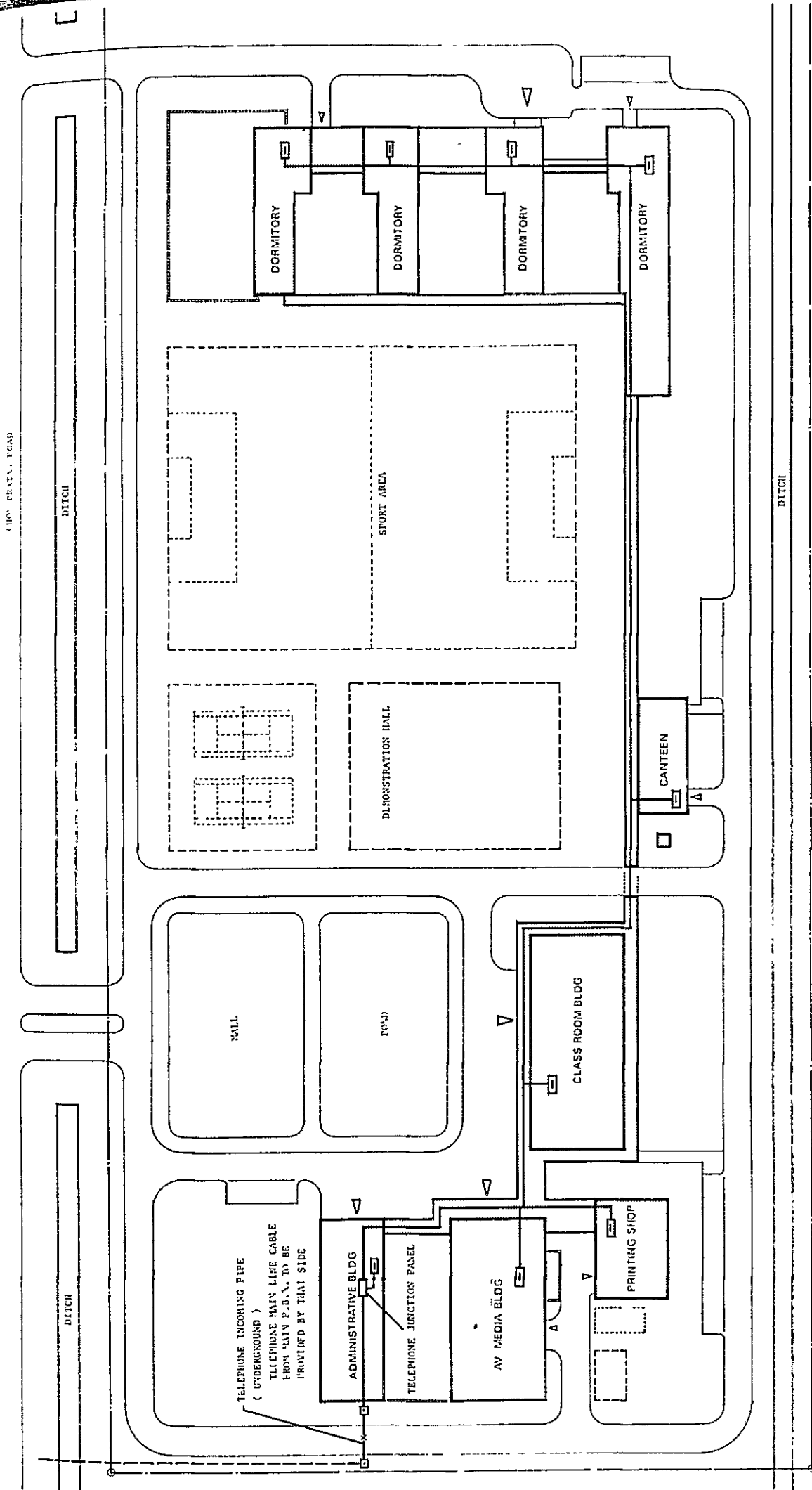
ONE PHASE LOAD



- FIGURE
- BOUNDING TO BE PROVIDED BY JAPANESE SIDE
- BOUNDING TO BE PROVIDED BY THAI SIDE
- BOUNDARY LINE
- ELECTRIC POWER LINE
- DISTRIBUTION BOARD
- HALL HALL

THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

ELECTRICAL SYSTEM



1100 PRIVATE ROAD

DITCH

STORGE AREA

ADMINISTRATION HALL

MALL

POND

CLASS ROOM BLDG

TELEPHONE INCOMING PIPE
(UNDERGROUND)
TELEPHONE MAIN LINE CABLE
FROM MAIN P.O.B. TO BE
PROVIDED BY THAT SIDE

ADMINISTRATIVE BLDG

TELEPHONE JUNCTION PANEL

AV MEDIA BLDG

PRINTING SHOP

CANTEEN

DORMITORY

DORMITORY

DORMITORY

DORMITORY

LEGEND

BUILDING TO BE PROVIDED BY JAPANESE SIDE

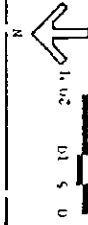
BUILDING TO BE PROVIDED BY THAI SIDE

BOUNDARY LINE

TELEPHONE MAIN LINE

TERMINAL PANEL

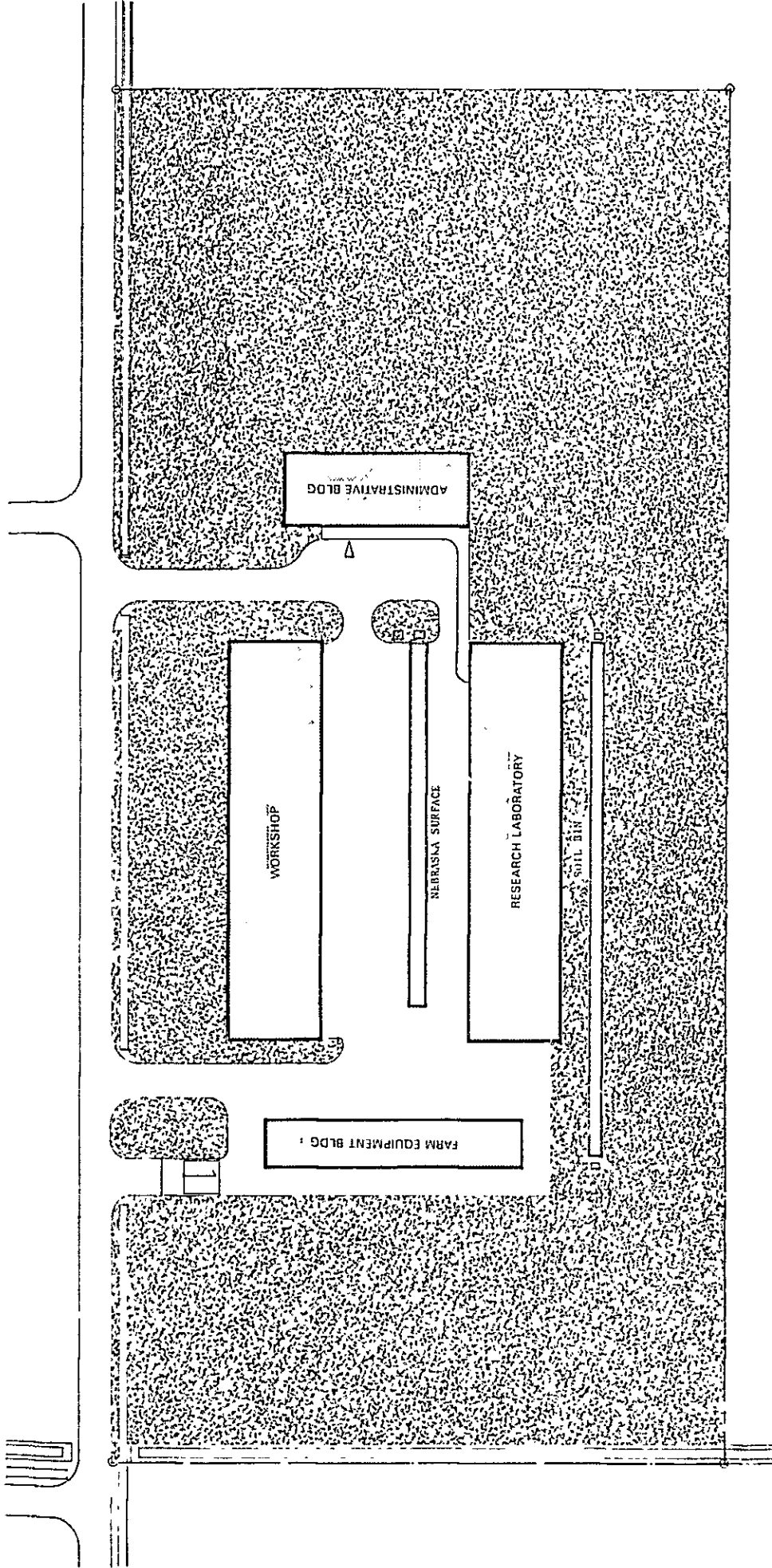
HAND HALL



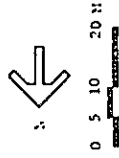
THE NATIONAL AGRICULTURAL EXTENSION AND TRAINING SERVICE CENTER

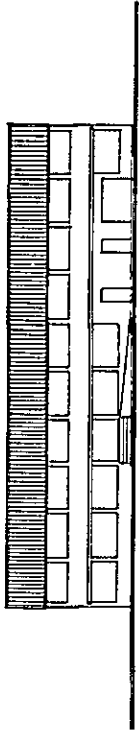
TELEPHONE SYSTEM

12



[Stippled Box] BUILDING TO BE PROVIDED BY JAPANESE SIDE
 [Solid Box] EXISTING BUILDINGS
 [Dashed Line] BOUNDARY LINE

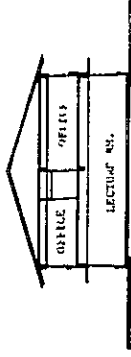




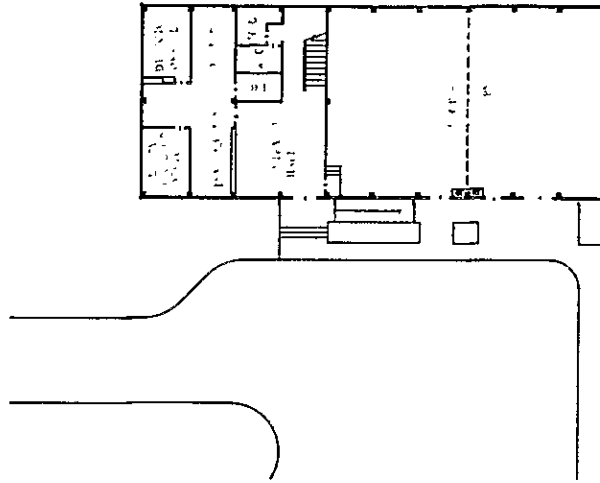
NORTH ELEVATION



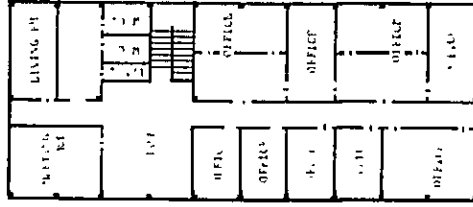
EAST ELEVATION



SECTION

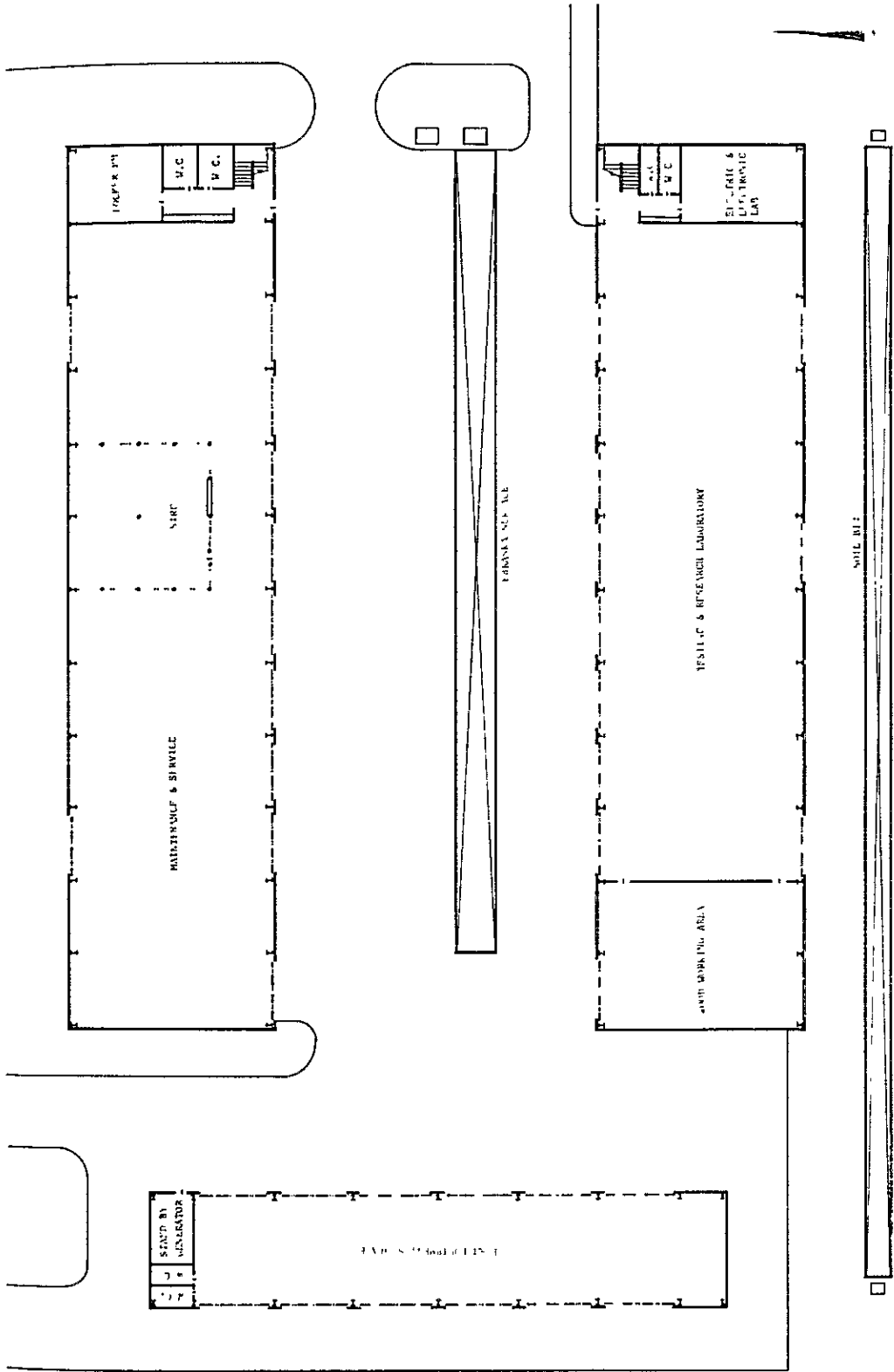


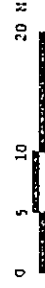
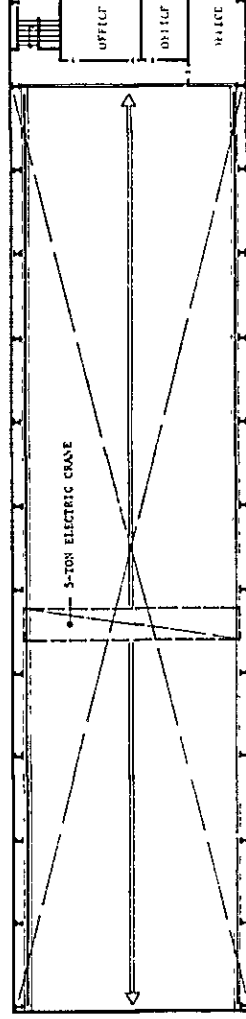
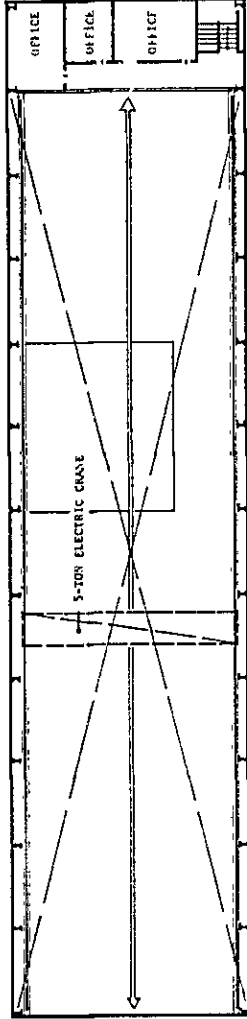
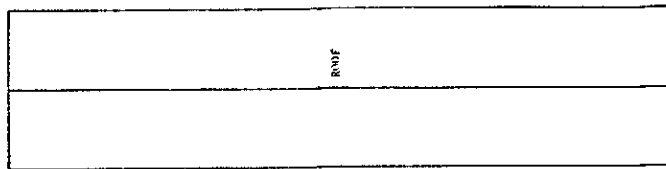
1ST FLOOR PLAN

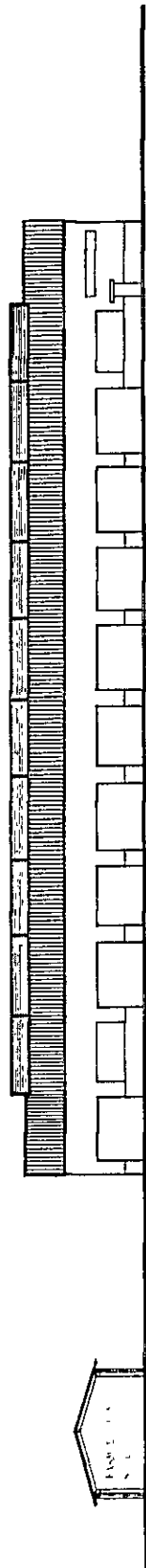


2ND FLOOR PLAN



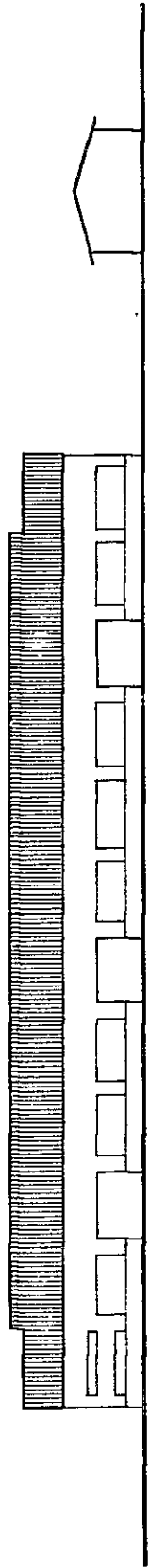




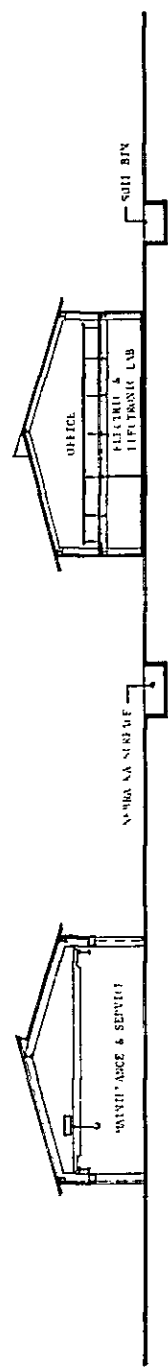


SECTION -1

SOUTH ELEVATION



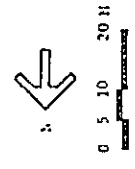
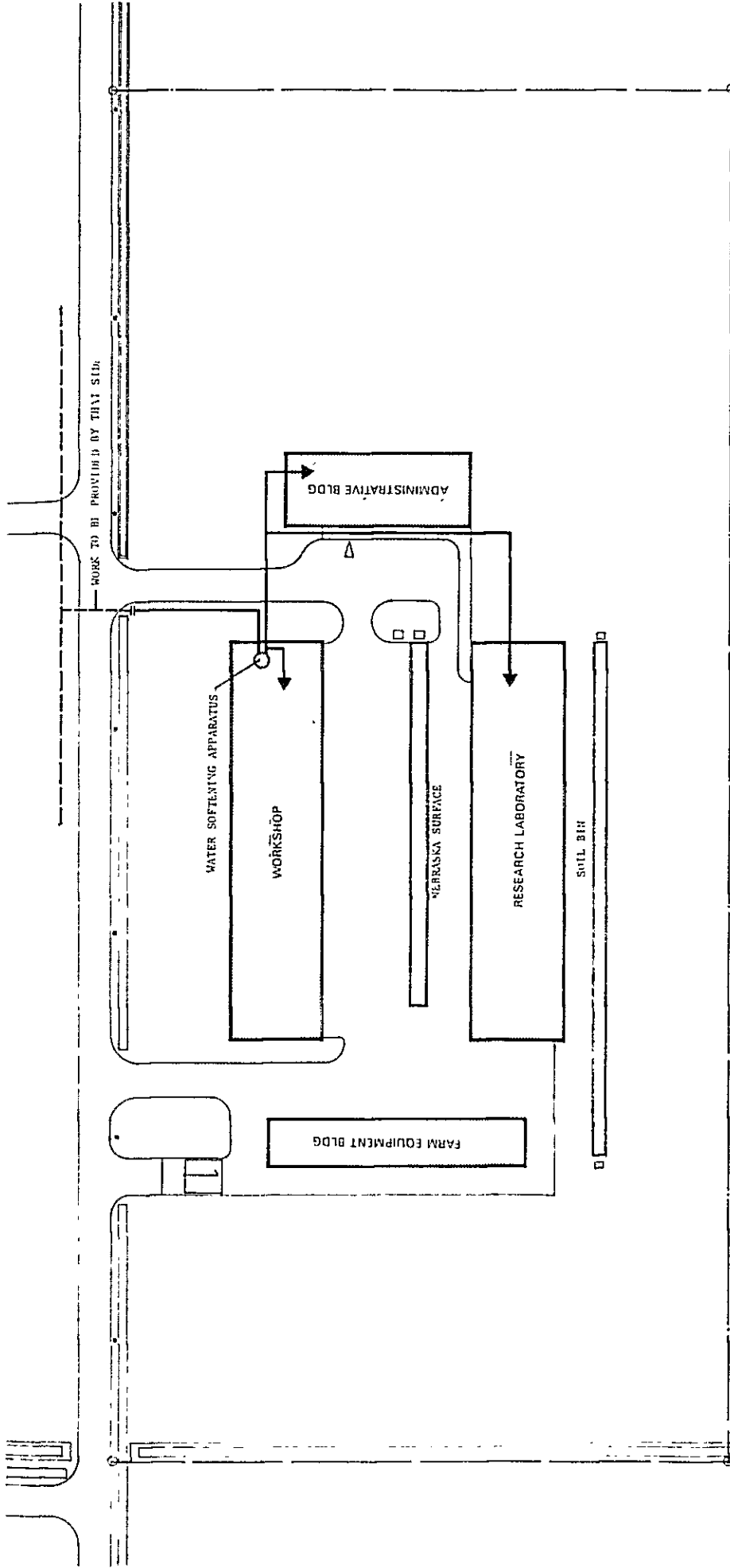
NORTH ELEVATION

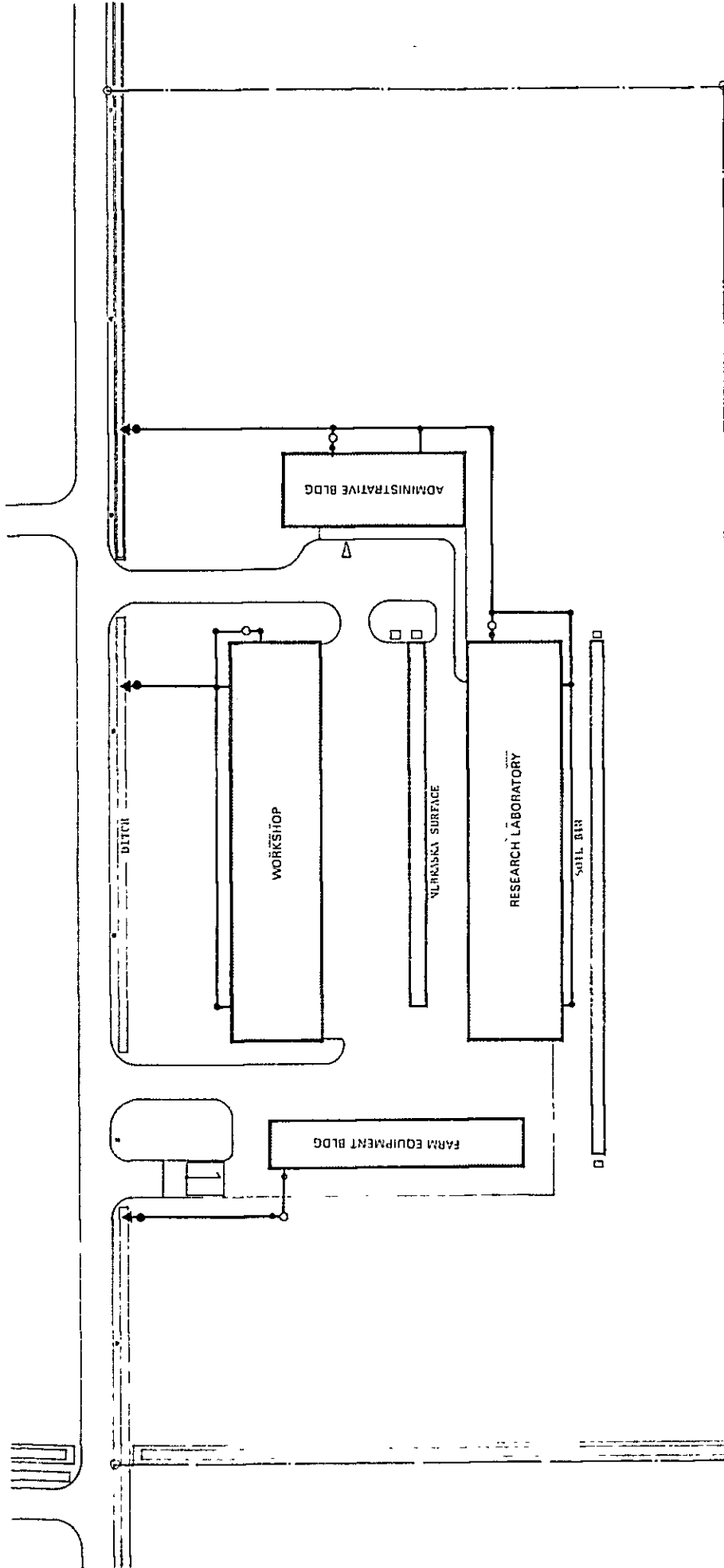


SECTION -2

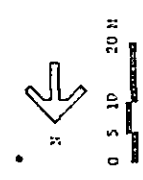


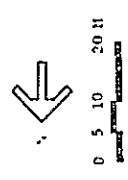
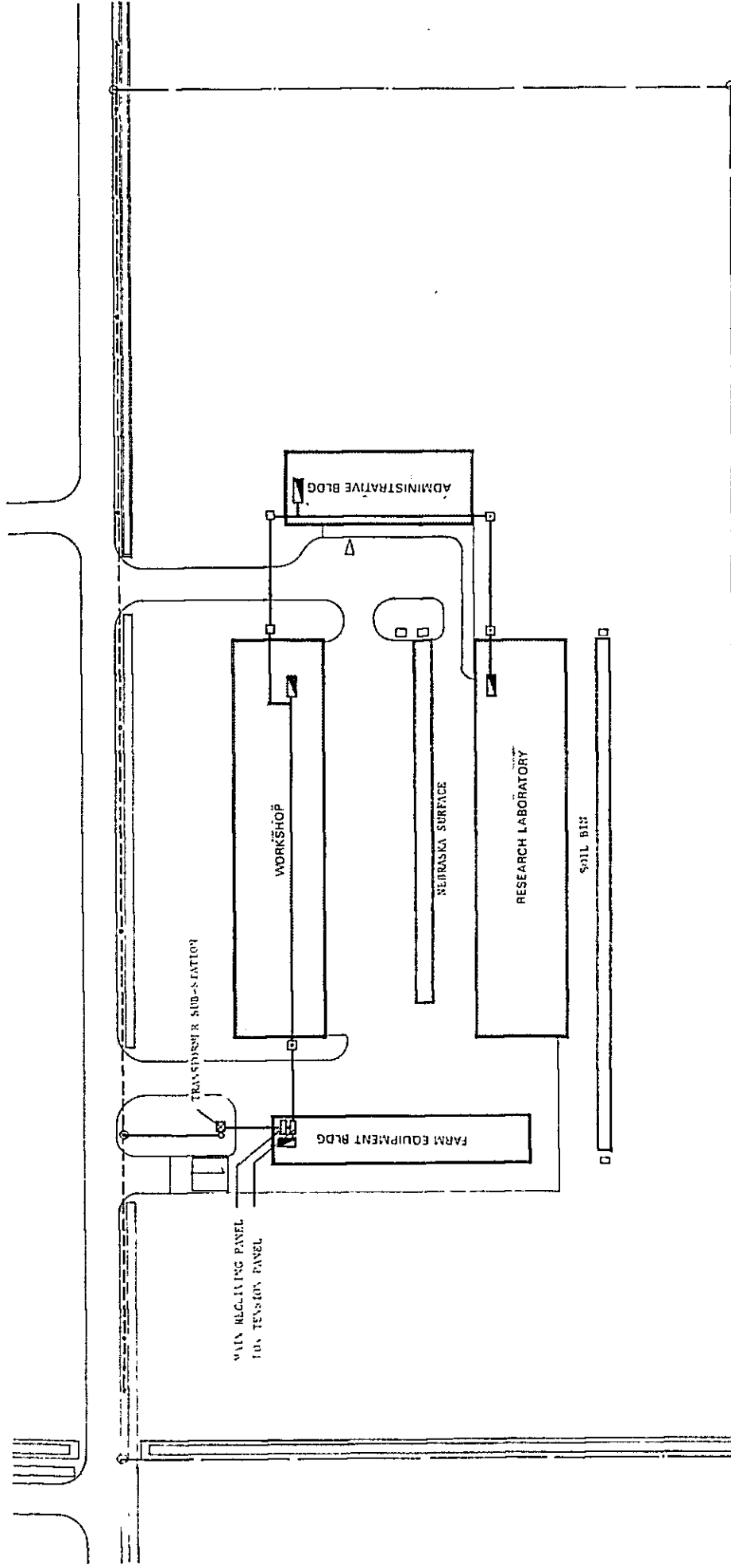
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






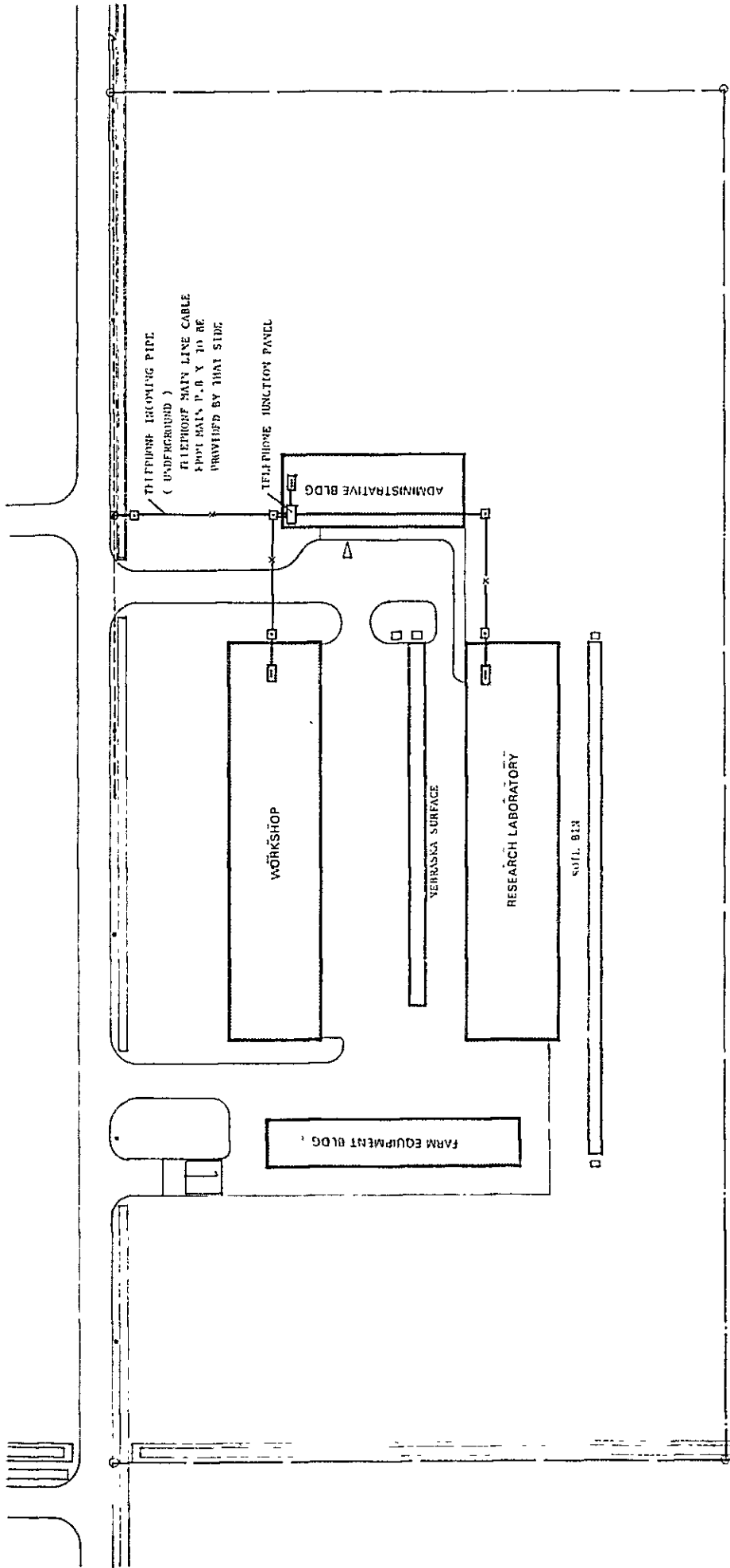


- LEGEND
- ▭ BUILDING TO BE PROVIDED BY JAWANT STUP
 - ▭ EXISTING BUILDINGS
 - - - BOUNDARY LINE
 - SEWAGE DRAINAGE LINE
 - CATCH BASIN
 - SEPTIC TANK





-  BUILDING TO BE PROVIDED BY JAPANESE SIDE
-  EXISTING BUILDINGS
-  BOUNDARY LINE
-  ELECTRIC POWER LINE
-  DISTRIBUTION BOARD
-  HAND HALL



TRENCHING INCOMING PIPE
(UNDERGROUND)
TELEPHONE MAIN LINE CABLE
FROM MAIN P. O. X TO BE
PROVIDED BY THAT SIDE

TELEPHONE JUNCTION PANEL

ADMINISTRATIVE BLDG

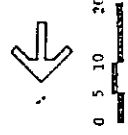
WORKSHOP

NEBRASKA SURFACE

RESEARCH LABORATORY

SOFT. BIN

FARM EQUIPMENT BLDG



7. SCOPE AND SCHEDULE OF THE CONSTRUCTION WORK

During the stay of the survey team in Thailand, specific discussions on the scope of work of the Thai side and that of the Japanese side were held on a number of occasions with the architect group with Dr. Sam-arng Srinilta, Project Coordinator, as the leader.

The positioning of the incoming electrical and water supplies as well as the method of drainage were reconfirmed and are indicated in the separately attached drawings.

Scope of the Construction Work and Work Demarcation

While the scope of work of the Thai side is already stated in the minutes, the demarcation of each work will be summarized below.

A: Fundamental Work

1) Site preparation work

(Thai side) Earthfilling will be performed before starting the construction so that the height of the site is 6.5 meters or more above sea level. In addition, weeds, trees, and other obstacles will be eliminated.

2) Water Supply

(Thai side) Responsible for providing a water supply of sufficient capacity as far as the site.

(Japanese side) Water supply from that point to the buildings.

3) Electricity

(Thai side) Responsible for providing a 22 KVA aerial

wiring to a point to be designated by the Japanese side.

(Japanese side) Responsible for work involved from that point for the lead-in and power station at each building.

4) Telephones

(Thai side) Responsible for the leading-in of the telephone trunk line from the campus and up to the telephone junction box to be established in the administrative offices.

(Japanese side) Responsible for setting up the telephone equipment, wiring and conduits from the telephone junction box onward, as well as for the underground conduit work necessary to lead the telephone trunk line through the site.

5) Drainage

(Thai side) Responsible for securing drainage facilities from the catch basin inside the site set up by the Japanese side.

(Japanese side) Drainage routes within the site.

B: Buildings

(Thai side) All construction work except for those buildings indicated in the Minutes.

C: External Work

(Thai side) Perimeter fencing; landscaping (grass, trees, etc.); outdoor sports facilities; and nighttime illumination for the CHON-PRA-TAN ROAD.

(Japanese side) Paving; outdoor lighting; main gate to the National Agricultural Extension and Training Service Center; and the pond and tree planting work in the center mall.

D: Furniture and Miscellaneous

(Thai side) . Furniture, fittings, and appliances including office desks and chairs, filing cabinets, conference tables and chairs, and lockers, etc.

. Dormitory appliances and fittings, including linen, etc.

. Fittings and utensils such as tableware for the canteen and cookware for the kitchen.

(Japanese side)

. Chairs for the auditorium

. Desks and chairs for the classrooms

. Furniture and beds for the dormitory

. Blackboards; notice boards; roll type screens for lecture rooms; blinds; curtains.

E: Transportation of Materials

(Thai side) Unloading in Bangkok of materials imported from Japan; customs clearance; transportation of materials to the construction sites.

(Japanese side) Packing of materials and equipment to be exported from Japan; insurance charges; loading onto vessels at port of Japan and marine transportation to Thailand.

Construction Schedule

The work for preparation of execution drawings relating to this subject facilities construction under the grant program will commence following the conclusion of the exchange of official notes between the two governments.

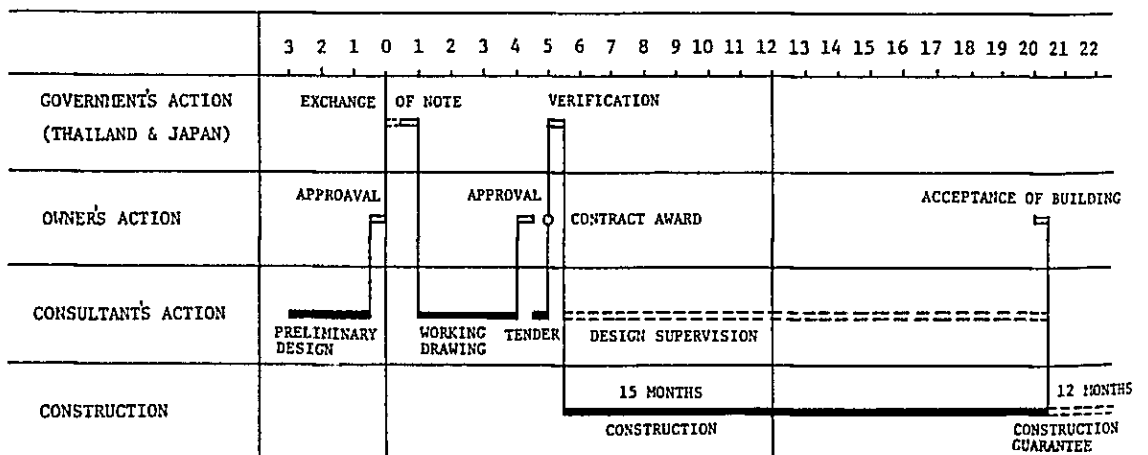
During this stage of the preparation of execution drawings, design plans and specifications necessary for the work will be prepared and the documentation necessary for the work bid contracts will be made.

Approval of the owner will be obtained on the contents of the execution drawings and documentation, after which contractors will be assembled and the work put out for tender.

After concluding a contract between the successful tenderer and the owner, verification of the Government of Japan will be obtained and the work will then start.

Judging from the scale, structure, and contents of equipment of the subject facilities, the period that will be required is approximately 15 months. The one-year period following the completion of the construction of the complex building and the delivery thereof to the owners will be the construction guarantee period.

Please refer to the subsequent pages for the construction schedule timetable.



TENTATIVE CONSTRUCTION SCHEDULE

APPENDIX

- 1 INTRODUCTORY STATEMENT OF THE PRELIMINARY DESIGN SURVEY TEAM FOR KASETSART UNIVERSITY DEVELOPMENT PROJECT IN THAILAND
- 2 MEMBER OF THE JAPANESE PRELIMINARY DESIGN SURVEY TEAM FOR KASETSART UNIVERSITY DEVELOPMENT PROJECT IN THAILAND (MARCH 1-6, 1979)
- 3 MEMBER OF THE KASETSART UNIVERSITY STAFF PARTICIPATING IN DISCUSSION (MARCH 1-6, 1979)
- 4 MINUTE (MARCH 5, 1979)

INTRODUCTORY STATEMENT OF THE PRELIMINARY DESIGN SURVEY TEAM
FOR KASETSART UNIVERSITY DEVELOPMENT PROJECT IN THAILAND

Gentlemen

I am pleased to be here again with the purpose to discuss further issues on the Kasetsart University Development Project following my previous visit to Bangkok, last July.

To begin with, with your permission, on behalf of the survey team, I would like to make a brief statement on what we have discussed among ourselves upon this subject before our departure from Tokyo in order to expedite our consultation here during our short stay.

I may explain the objective of this Survey Team.

It is, based on the results obtained by the Technical Cooperation Survey Team, last July, to confirm the extent of the intended financial cooperation concerning buildings and equipment in the National Agricultural Extension and Training Service Center and also to confirm the Agricultural Machinery and Equipment Center by the Japanese grants to contribute to the development of the Kasetsart University.

In addition to the above, we would like to formulate specifications for the implementation design which will be carried out in the next stage.

However, with regard to the Japanese Government's budget for fiscal 1979, the budget draft which will be submitted to the Parliament for approval at the beginning of 1979, is now being prepared by the Ministry of Finance. Therefore, no definite magnitude of grant aid for this project can be disclosed at this stage.

Finally, I expect under the current survey, that free discussions will be made with regard to the scale and the contents of the buildings and the kind and number of equipments to be supplied.

I wish to express my sincere thanks for your continuous kind cooperation and hospitality extended to our team.

Thank you.

MEMBER OF THE JAPANESE PRELIMINARY DESIGN SURVEY TEAM
 FOR KASETSART UNIVERSITY DEVELOPMENT PROJECT IN THAILAND
 (MARCH 1 - 6, 1979)

<u>Assignment</u>	<u>Name</u>	<u>Position</u>
Leader	Mr. TOSHIJIRO ORIHARA	Chief Advisor of Extension Work Extension and Education Division Agricultural Production Bureau Ministry of Agriculture, Forestry and Fisheries
Architectural Design	Mr. HIROSHI IZUHARA	Architect International Department Kume Architects-Engineers
Equipment	Mr. SHUHEI KUBOTA	Designer Audio Visual Consultant Center

MEMBER OF THE KASETSART UNIVERSITY STAFF PARTICIPATING IN DISCUSSION
 (MARCH 1 - 6, 1979)

1. Executive Committee for the Project

1. Prof.Rapee Sagarik	Rector	Chairman
2. Prof.Dr.Sutharm Areekul	Vice-Rector for academis Affaris	Vice-Chairman
3. Prof.Dr.Phaitoon Ingkasuwan	Vice-Rector for Business Affaris	Member
4. Assoc.Prof.Arb Nakajud	Vice-Rector for Development	"
5. Assoc.Prof.Dr.Watna Stienswat	Vice-Rector for Kamphaengsaen Campus	"
6. Assist.Prof.Dr.Aroon Jantanao	Dean of Faculty of Agriculture	"
7. Prof.Dr.Krisna Chutima	Dean of Faculty of Science and Arts	"
8. Assist.Prof.Boonsom Suwachirat	Dean of Faculty of Engineering	"
9. Assist.Prof.Dr.Kamphol Adulavidhya	Director of Research and Development	"
10. Mr.Porn Suwanvajokkasikij	Director of Extension and Training Office	"
11. Prof.Pavin Punsri	Director of Highland Agricul- tural Research Project	"
12. Assoc.Prof.Dr.Sam-arng Srinilta	Project Coordinator	Member and Secretary
13. Dr.Prachak Chareon	Assistant Project Coordinator	Member and Assistant Secretary

2. Project Implementation Working Group

1. Dr.Sam-arng Srinilta	Soil Science	Coordinator and Chairman
2. Dr.Prachak Charoen	Soil Science	Assist.Coordi- nator and Vice-Chairman

3.	Dr.Amnat Suwanarit	Soil Fertility	Member
4.	Dr.Sookapracha Vachanonda	Organic Chamistry	"
5.	Mr.Sophon Duangwasdi	Cooperatives	"
6.	Mrs.Chamrasratna Pichaicharnarong	Marketing	"
7.	Mr.Vittavas Buachandra	Soil Science	"
8.	Mr.Poom Khumgliang	Agricultural Extension	"
9.	Mr.Tatchai Saengsingkaew	Agricultural Extension	"
10.	Mr.Suchote Daosukho	Agricultural Extension	"
11.	Dr.Thira Chaichanavong	Civil Engineering	"
12.	Mr.Kumroplok Suratsawadi	Architecture	"
13.	Mrs.Yupayong Hemasilpin	Architecture	"
14.	Mr.Sermphol Buengsung	Agricultural Engineering	"
15.	Mr.Ackradej Artachinda	Agricultural Engineering	"
16.	Mr.Ban Chaw Bhaholyothin	Agricultural Engineering	"
17.	Mr.Supot Fengfupong	Agronomy	"
18.	Dr.Jaron Kumnuanta	Microbiology	"
19.	Dr.Neungpanich Sinchaisri	Insect Toxicology	"
20.	Dr.Thira Sutabutra	Plant Virology	"
21.	Mr.Thanakorn Jarupat	Plant Virology	"
22.	Dr.Supat Attathom	Plant Virology	Member and Secretary
23.	Mr.Wattana Swanyatipati	Agricultural Extension	Member and Assistant Secretary
24.	Mrs.Channuan Ratarasarn	English	Member and Assistant Secretary