Chapter 4 CONSTRUCTION SITE

4–1 Conditions of Site

The site is located at Parami, Mayangon township, Rangoon city, 12 km north from the center of the city. A main road leading to the site is Parami road (width of 33 m and driveway of 6.5 m), which is a branch road on the right of heavy-trafficed Kabaye Pagoda road which leads to the international airport. Stretching across the west of the site is Rangoon city circuit line of Burma Railway Corporation, with Parami station located around the intersection with Parami road. This intersection is planned to be fly-over in future. A bridge construction is now under way (scheduled to be completed by the end of March, 1983), 100 m east of the intersection, beyond which the proposed site is situated.

The site is 183 m long in the north side, 531 m in the west side, 52 m in the south side and 555 m in the east side, thus making up a deformed trapexoidal shape land with a total area of around 10 ha. The area as a whole is presently part of paddy field.

The budget for boundary fencing has already appropriated by AFPTC. Stretching in the west side is Burma Railway line, while further to the west there are residential areas. Located in the north is the compound of Burma Broadcasting Service with a tower. In the east side there is a planned but unfinished road construction, in the neighbourhood of which the Pazaundaung Creek runs.

In the south side of Parami road, and further in the south-east there are the two-storeyed wooden building built by Construction Corporation, as well as some thatched huts alongside the creek. The view from Parami road is unsightly owing to presence of private huts and a unfinished bridge construction, while the sight from the railway lines is excellent. Transport is also convenient because of proximity with Parami road and Parami station.

Meanwhile, in the site the Post-harvest Technology Training Center building is now being built with the ADB loan; reinforced concrete structure and wooden roof with slate, wall of brickwork. The building is scheduled to be completed by the end of March 1983.

There are three creeks in the site, 15 m wide and 0.9 m deep, flowing east-to-west. Otherwise the site is flat. The site is to be filled with soil all over upto the height of some 350 mm, in level with the on-going Training Center site, so as to prevent the possible back flow of the creeks during the rainy season.

Transport of construction material to and from the site, will become easy when the bridge construction by Construction Corporation is completed in future. However, if it is delayed behind the schedule, a temporary bridge will need to be built up. If this is impossible to make, transport is to be made through the eastern side unpaved road, which requires construction of two temporary bridges on route.

4–2 Natural Condition

Rangoon city is located in the monsoon zone, with high temperature and high humidity. Annual average temperature is 26 - 28 °C, while annual average humidity is 50% (dry season) and 80% (rainy season). Therefore, the building planning will have to take into account protection against the sunlight, provision of ventilation and drainage of rain water.

The foundation soil of the site is mostly of clay with poor bearing force, owing to its location in alluvial strata of the delta area and also in proximity of Irrawaddy river and Pazundaung Creek.

4–3 Infrastructure of the Construction Site

(1) Electricity supply

The electricity is supplied by Electric Power Corporation, with the commercial voltage of 230 V, 400 V, 6.6 kV and 33 kV, and with the frequency of 50 Hz.

The in-house distribution system employs three phase 400 V for the main power services, while lighting receptacle outlets are for single-phase 230 volts.

The site can be power-supplied by use of under-ground cable of 6.6 kV from Kabaye-west sub-station of Electric Power Corporation, with the estimated length of such cable of some 1.9 km. The cable

used should be of 11 kV, in anticipation of the eventual elevating of transmission voltage from 6.6 kV to 11 kV. Power is available upto 500 kVA.

Regarding the stability of power supply, Electric Power Corporation mentioned 6% of voltage fluctuation and 1% of frequency fluctuation, while there are actually occurances of some 10% of voltage fluctuation. Power failure takes place around five times a month, each time lasting roughly 30 minutes.

(2) Telephone system

The telephone system is installed by Post and Telecommunications Corporation. The site is to be serviced with underground cable from Mayangon Exchange Office, with the estimated installation period of a month.

(3) Water supply

The water main pipes of 56 inch, owned by Rangoon City Development Committee, have been installed around 200 m away in the west of the construction site in north-south direction. Therefore, the water supply is available by branching therefrom. The branching has alternatives of (i) through 8" pipes installed on Kabaye Pagoda road, and (ii) through 12" pipes installed on Parami road.

Regarding alternative (i) above, the length of lead-in pipe is around 240 m, enabling the round-the clock water supply.

Meanwhile, as to alternative (ii), the lead-in pipe is around 420 m length and allows for the six-hour- a day supply, between 1.00 pm and 7.00 pm. Therefore, alternative (i) is favaourable.

The water quality meets with the potable water requirements specified by WHO, according to the test results by National Health Laboratory.

The lead-in water pipes may be designed to be 1-1/4 inches, allowing for the hourly capacity of some 1.8 m^3. Storage tank should be provided so as to cope with lowering of water pressure down to 7,000 mm Aq or below in the dry season.

Underground water from the well of 60 - 90 meters deep presently used contains much of iron and iron separator is needed for drinking purpose. Therefore, use of the well water in not recommended in this project.

(4) Sewage system

Sewage system is presently installed in a very few area of Rangoon city. Therefore, the neighbourhood creeks (branches of Pazaundaung creek) are to be utilized. Toilet water should be pre-treated by purifier, while miscellaneous waste water might be discharged without treatment.

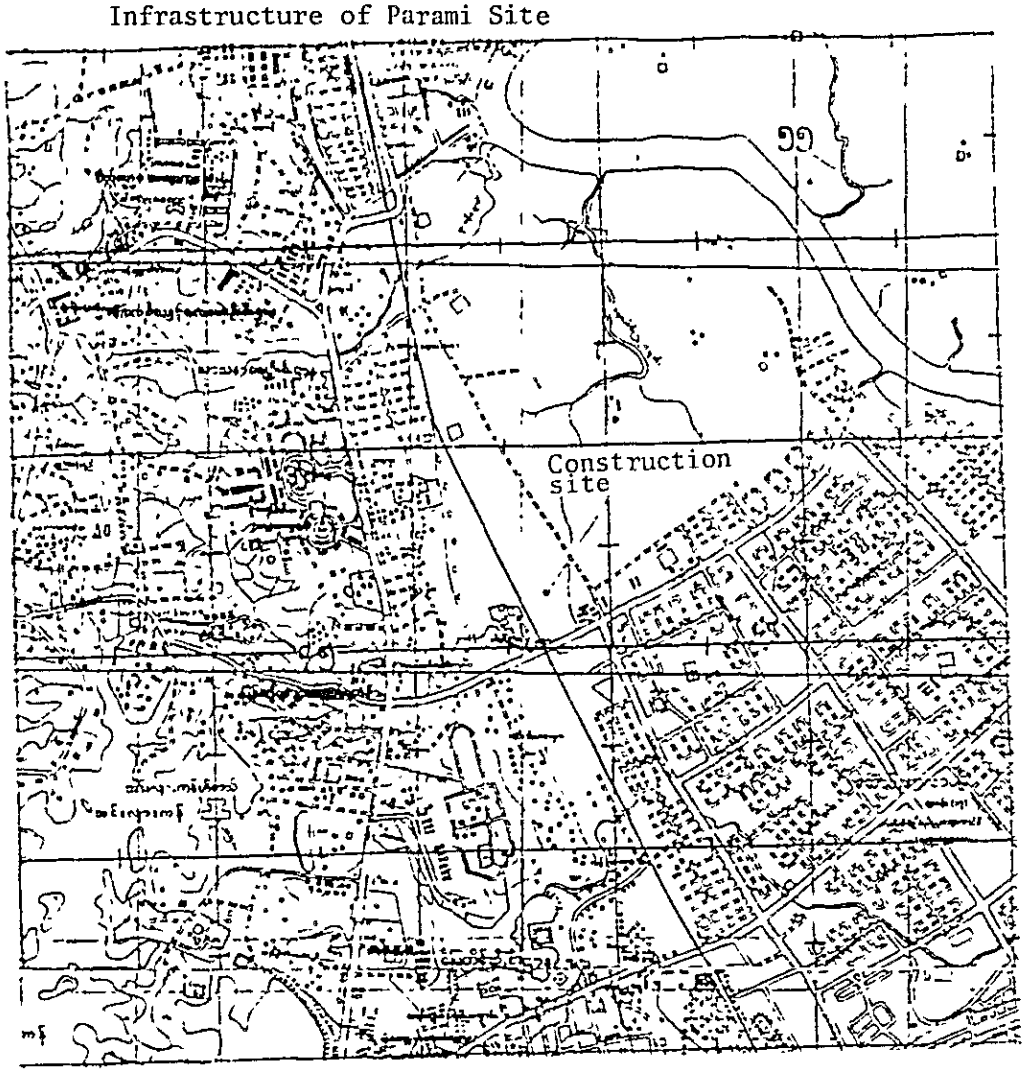
(5) Fuel gas supply

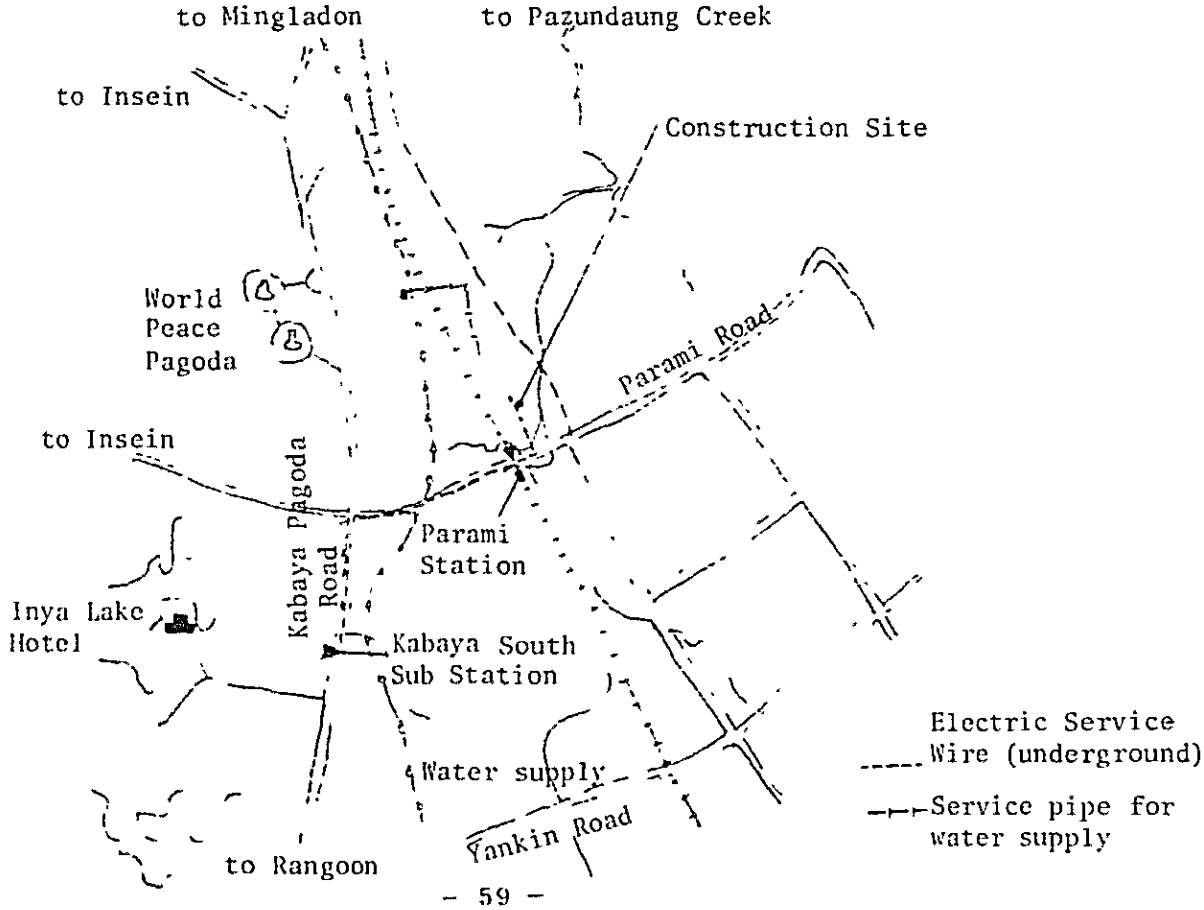
Gas supply system is not existing at present in Rangoon city.
Fuel gas such as propane etc. is not in use there.
Popular fuels are wood and coal. Kerosene also is used.

4-4 Construction Industry

All of the construction work undertaken by the government is performed by Construction Corporation. The Corporation is directly under control by Minister of Construction, and functions as a subordinate organization of Construction Council (policy-making body, equivalent to the Ministry of Construction in Japan).

Infrastructure of Parami Site

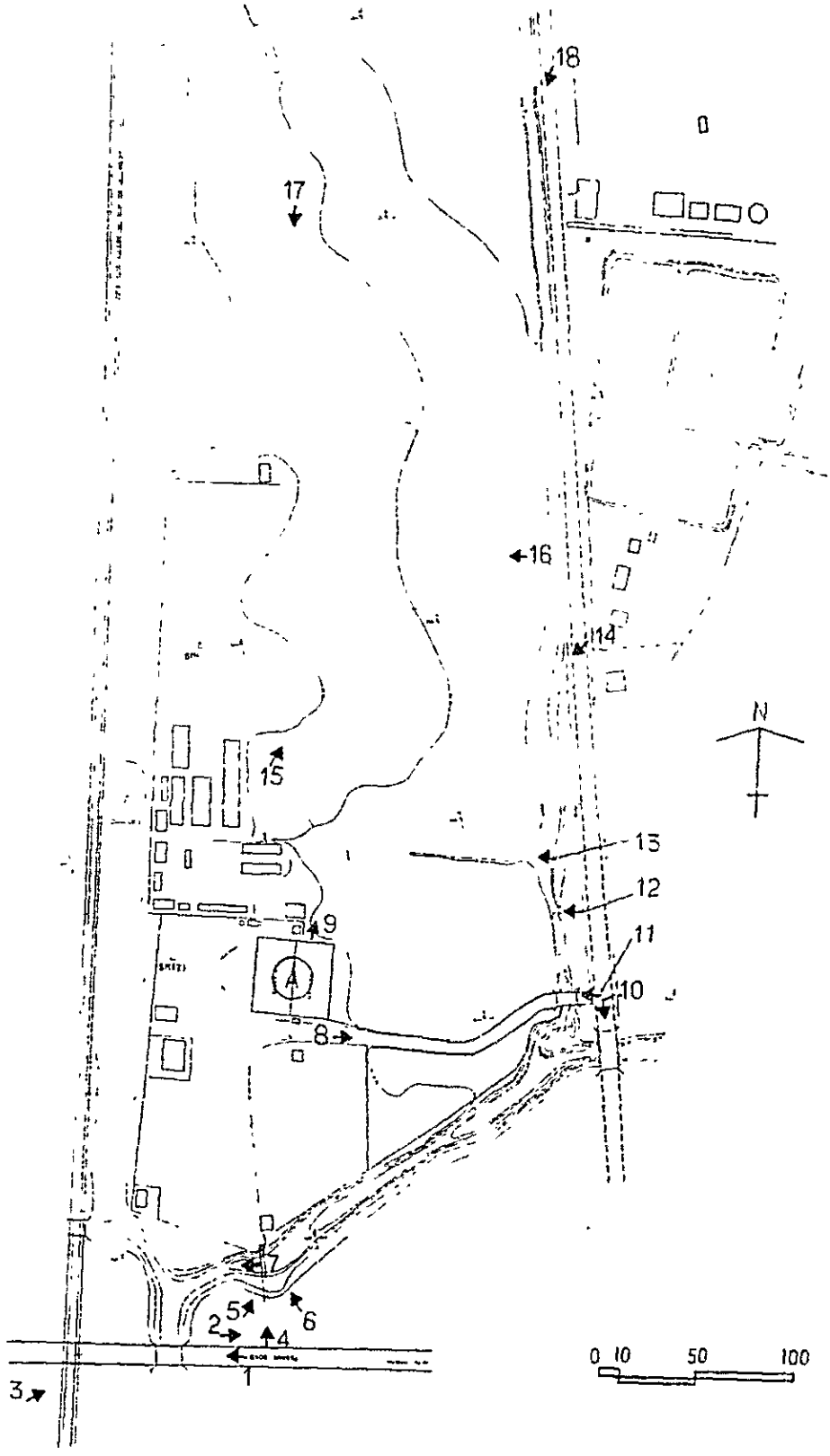




Photagraphs Near Construction Site

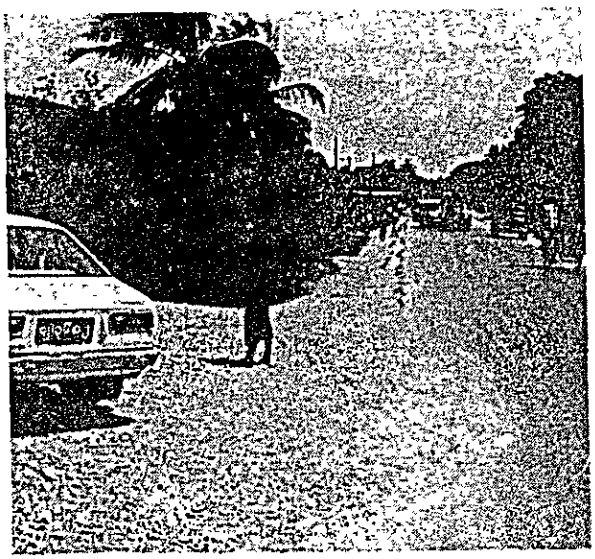
Note: The number and ↗ mark indicate the photographing direction of each picture attached.

A: PTAC

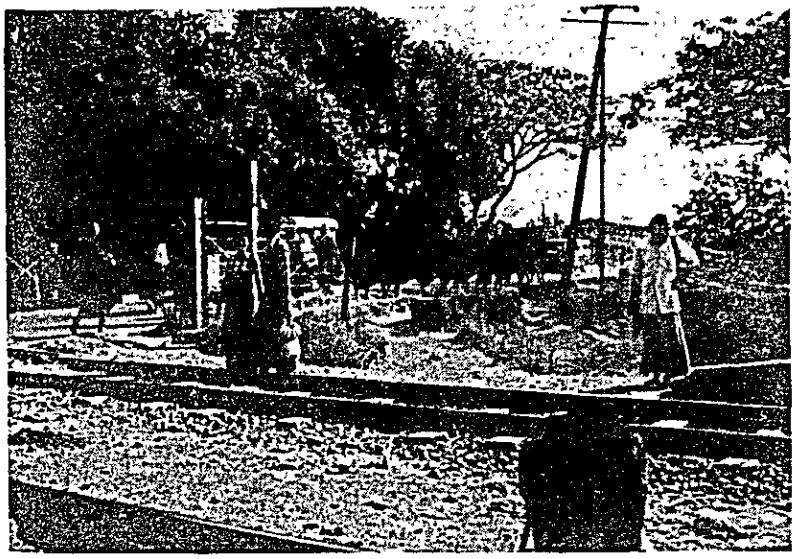


1. Parami Road

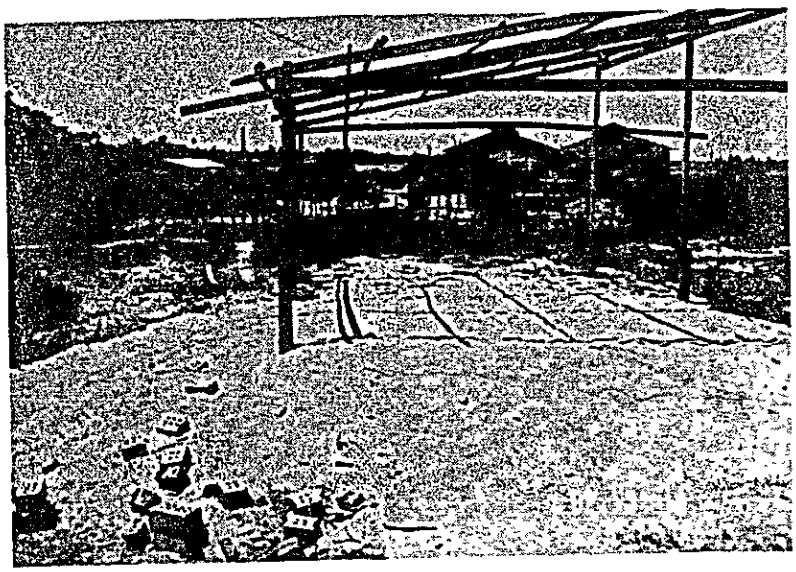
2. Parami Road



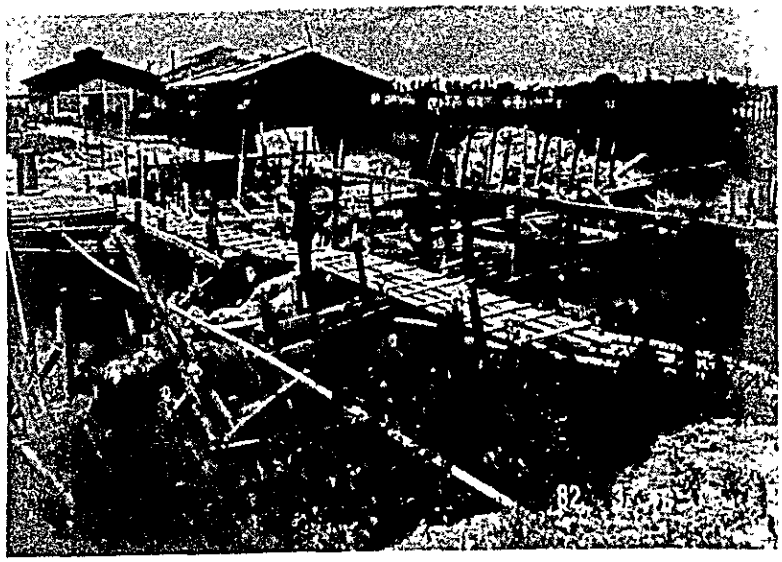
3. Parami station and its neighbourhood



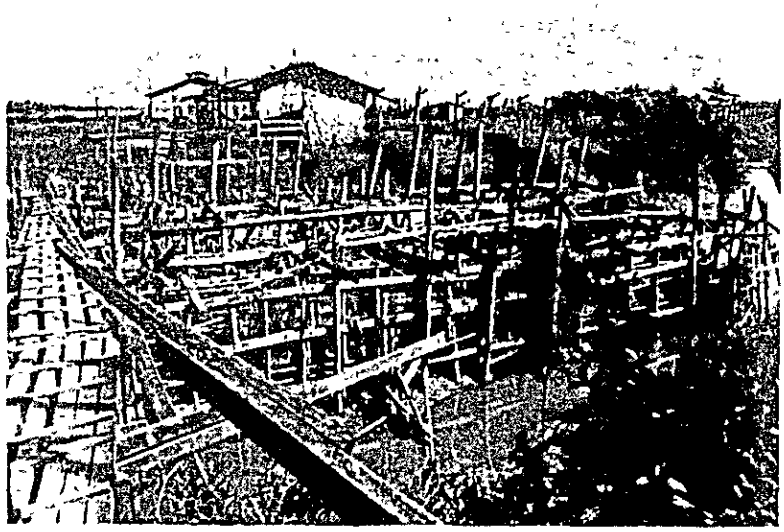
4. Post-harvest Technology Training Centre from Parami Road



5. Bridge over creek, being under construction

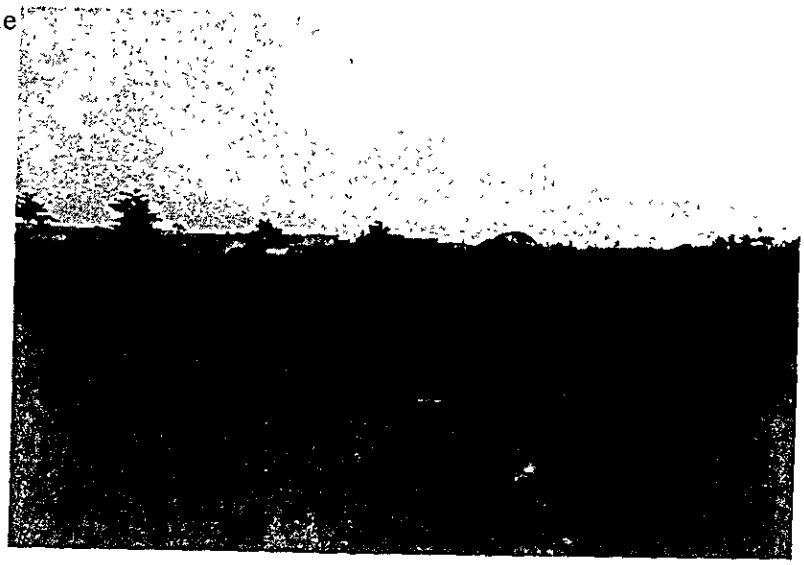


6. Bridge over creek, being under construction



7. Creek from temporary bridge (The water came up to the withered grass at the right bank)

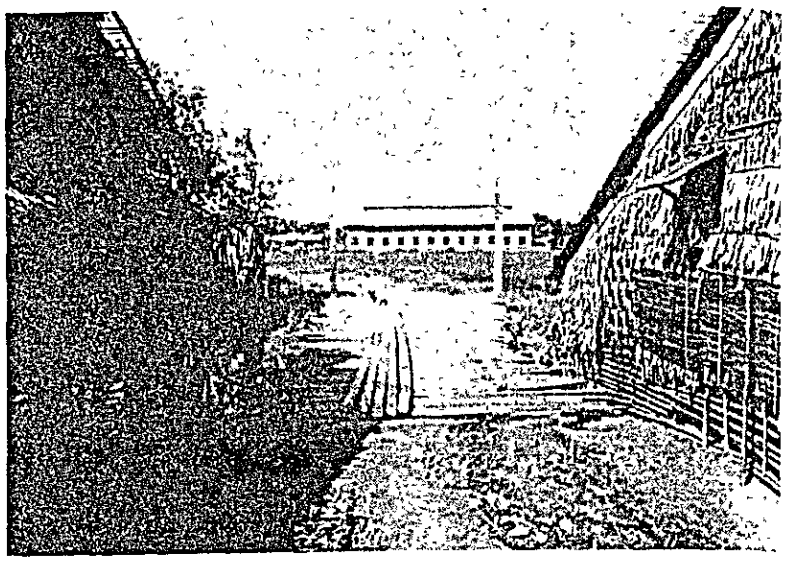
8. Approaching road from east side



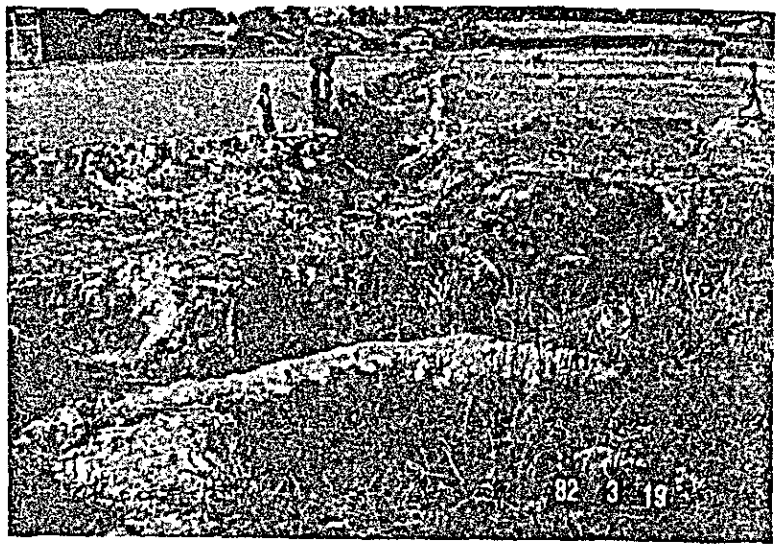
9. Whole view of construction site

10. Eastern bridge of proposed road

11. Post-harvest Technology Training Centre from eastern entrance



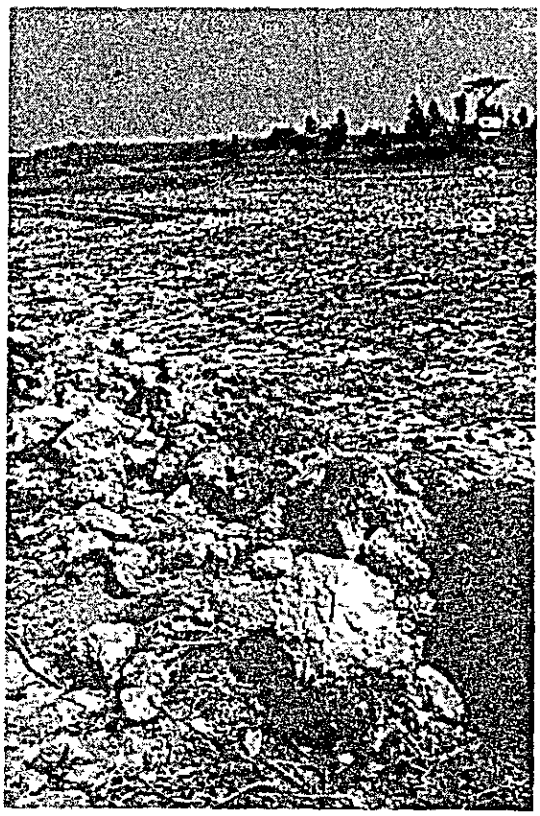
12. Waterway (ca. 900 m/m deep)in the central part of construction site



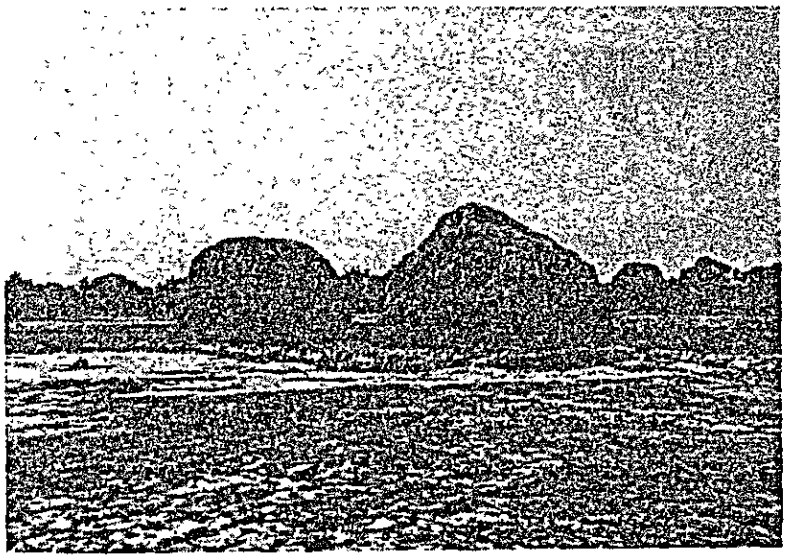
13. Water way (1,200 m/m deep) near boundary

14. View from eastern unpaved road

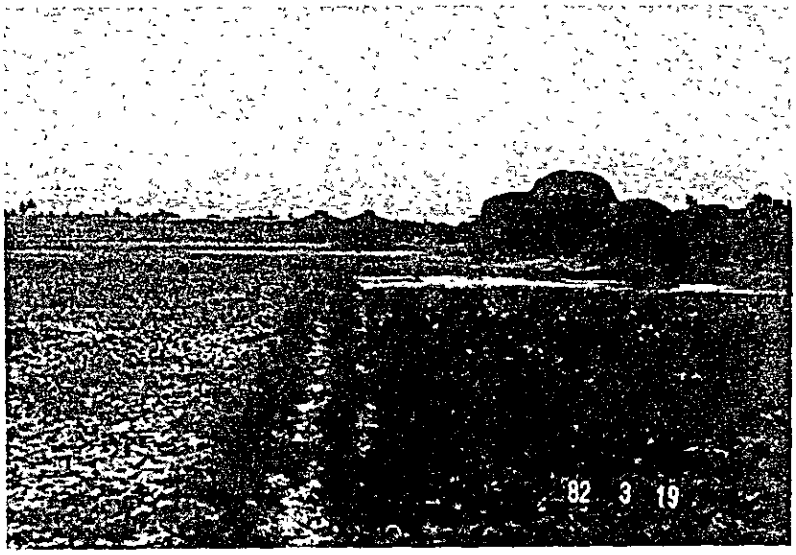
15. View of TV Tower from Post-harvest Technology Training Centre



16. Straw piles

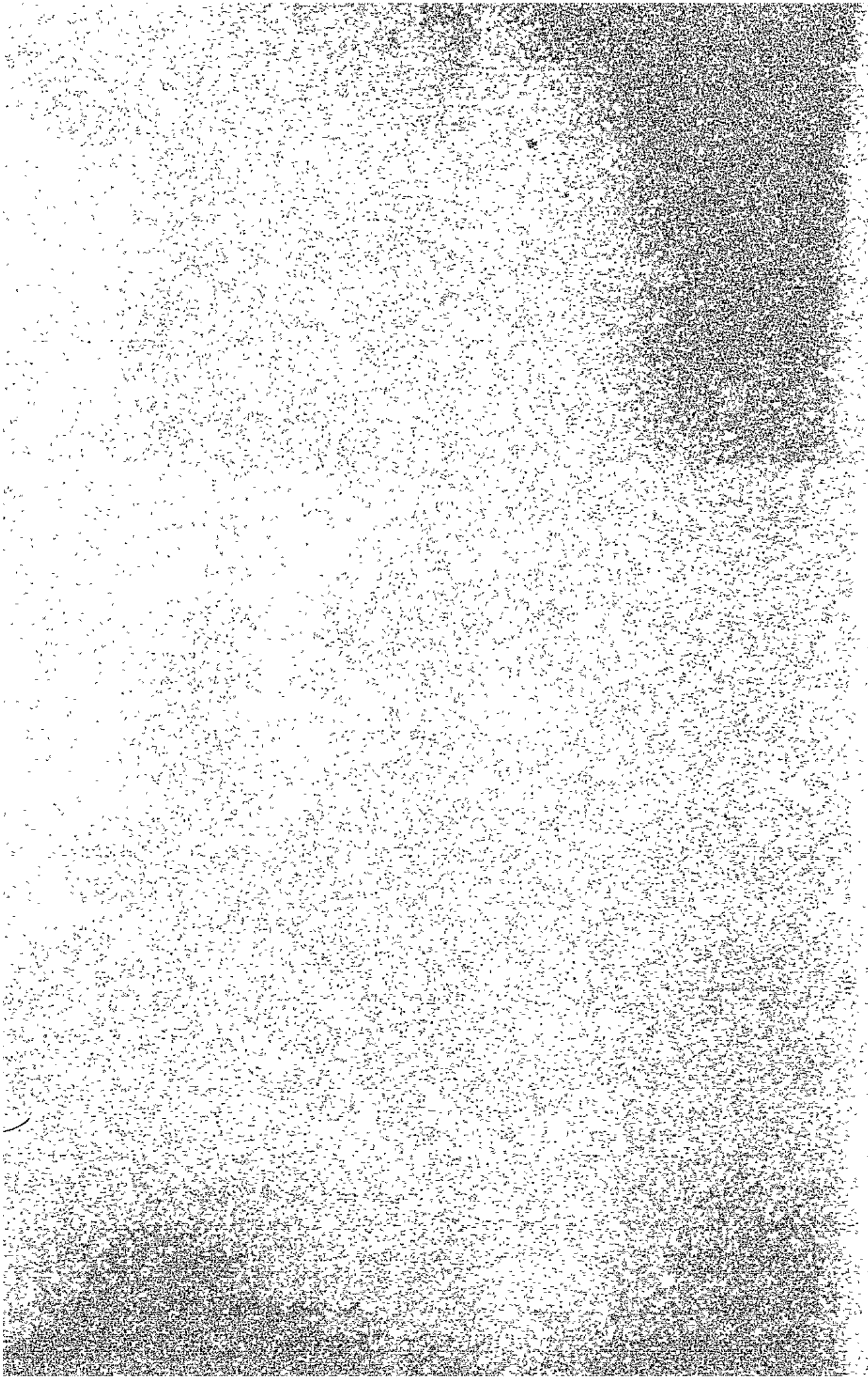


17 . Post-harvest Technology Training Centre from North Side



18. Construction site from TV tower

Chapter 5 BASIC DESIGN



Chapter 5 BASIC DESIGN

5–1 Basic Principles

PTC buildings and facilities comprise of administrative, research and living facilities. Considering the efficient operation of these departments, along with their functions, the following principles were decided upon:

1) Buildings and facilities with function-oriented design and layout. Arrangement and construction is to be done to enable the practical performance of post-harvest processing technology research, experiment, development and application.
Inter-communication among individual laboratory and testing rooms is to be assured so as to carry out cooperation efficiently among different research departments. Publication, propagation, advertisement, and promotion are also to be insured.
Care will be taken so that PTAC officials can devote themselves to their research assignments comfortably.

2) Facilities and equipment easy to manage and maintain.
Arrangement is planned to allow for future change, expansion and reform of activity program.
Intimate communication between administrative departments and individual research departments is to be provided.
Buildings and facilities are designed easy to manage and maintain, at the least possible expense.

3) Building construction suitable for climatic conditions in Burma
Considering the climatic conditions and construction situation prevailing in Rangoon city, pleasant building environment is to be assured.

4) Utilization of Burmese construction practice, and economy of construction cost.
Unit cost of building construction shall be made as low as possible, while utilizing the local building design, engineering and material as far as practicable.

Spacing between individual buildings should be made as near as possible, so as to minimize the piping length for electrical and mechanical installations, with aim to realize the eventual saving in construction cost.

5–2 Equipment and Material Program

5-2-1 Principle in selecting equipment and material to be furnished

Equipment and material proposed for PTAC will be of minimum but required ones to meet the needs.
The locally manufactured equipment and material will be used as long as they can comply with the required specification, and only when they fail it foreign-made are to be employed.

When using the foreign-made equipment and material, items should be selected by taking into account availability of consumables and spare parts, coupled with the level of local skill.

As regards equipment for planning, control, publication etc., those items will be installed then can facilitate efficient and accurate work.

Meanwhile, routine work such as calculation, sorting, transcription, registration, counting, reference etc., should be performed by use of necessary effective equipment and material, without relying much on cheap man-power, as these are liable to cause frequent errors and mistakes and decline in office efficiency.

The workshop should be equipped so as to make possible the production prototypes developed in individual research department development and manufacture of experimental instruments and repair of major equipment used in PTAC.

The laboratory equipment and material will be selected from those meeting with the nature of survey, research, and development needed in Burma. Since the laboratory equipment can range over the extensive scope according to the required range, precision and depth of work with wide price variations, items and the quantity to be furnished will be determined based upon temporary assumptions on the skill and qualification of PTAC staff and the initial scope of activities.

5-2-2 Outline of equipment to be supplied to each department
(For detail, refer to APPENDIX 1-4)

A. Planning, Promotion and Budget Department

1) Equipment for planning, coordination, recording, conference, etc.
(Shelves, filing instruments, blackboards, tape recorders, desks and chairs, desk for conference, stationary, and others)

2) Equipment for public relations activity (projectors, loud speakers, and others)

B. Administration Department

1) Equipment for office administration, accounting etc.
(Typewriters, copying machines, mimeograph, bookshelves, calucu-lators, inter-com, stationary, and others)

2) Library
(Books, magazines, periodicals, bookshelves, library, retrieval system, reference cards, microfilms, microfilm reader, and others)

3) Workshop
(Metal-processing and wood-working tools, forging equipment, electric tools, hand tools, measuring instruments, painting utencils, transport instruments, working table, shelves, and others)

4) Equipment for supporting conference, lecture, research, publicity etc.
(Auditorium, tape recorders, video recorder, projector and project screens, blackboards, dark room, desks and chairs, and others)

5) Equipment for transportation and communication
(Micro bus, passenger cars, trucks, motor cycles, bicycles, repairing outfit, public telephone, inter-com etc.)

6) Equipment for daily lives, welfare and security
(Canteen and kitchen utensils, water supply, ventilation and air-conditioning, safety and fire-fighting system, etc.)

7) Equipment for maintenance and environment preservation
(Building maintenance instruments, trees and plants, water supply and sewage system, road maintenance instruments, electrical installations, and others)

C. *Quality Control and Standardization Department*

1) Grain physical analysis laboratory
(Sample pulverizer, measuring instruments, grain testing instruments, and others)

2) Grain chemical analysis laboratory
(Testing instruments, chemicals, ventilation system, and others)

3) Equipment for sampling and sample conservation
(Sample containers, shelves, and others)

D. Storage, Pest Control and Handling Department

1) Pest control laboratory
(Insect testing instruments, fumigation instruments, pesticides and chemicals, and others)

2) Equipment for microbes and micotoxin testing
(Analysers, microscope, testing instruments, and others)

3) Storage testing structures

(Paddy storage warehouses of various design, related facilities, aeration system, measuring instruments, and others)

4) Grain handling equipment
(Measuring equipment, bag and bulk handling equipment, and others)

E. Milling and Processing Department

1) Milling testing laboratory
(Test husker, test whiteners, measuring instruments, and others)

2) Standard rice mill
(Rice mill with capacity of about 2 ton paddy per hour and the accessaries)

3) Comparative test mill
(Various milling equipment, related facilities, and others)

4) Dryer testing room
(Various dryers, measuring instruments, and others)

5) Parboil testing room
(Parboiling equipment, measuring instruments, and others)

6) Paddy storage
(Paddy storage, conveyors, paddy cleaner, and others)

7) Drawing and designing room
(Draftmen outfit, and others)

F. Bran Utilization Department

1) Oil laboratory
(Testing equipment for oil and fats, chromatograph, and others)

2) Oil and Fats Industrial Test room
(Bran oil extraction equipment, refining system, and others)

G. Marketing and Economy Department

1) Equipment for information collection, analysis, survey, information retrieval, etc.
(Reference materials, miscellaneous, stationary, and others)

5–3 Facilities Necessary for the Project

5-3-1 Facilities by function

From the view point of their functions, facilities are generally divided into three parts as follows;

1) Facilities for research activities, laboratory, testing room, testing equipment, etc.

2) Facilities for managements, control, and services to each department - administrative office, conference rooms, meeting room, library, workshop, car port, guardman's room, etc.

3) Facilities for accommodating PTAC staff and visitors - lavatory, canteeen, staff house, etc.

5-3-2 Scale of facilities

They were estimated with consideration for the number of posted staffs and the type of activities at each department as follows;

Buildings	Quantity	Area (m^2)
Main building	1	1,725
Testing rooms		
- dryer and parboil	1	720
- comparative and standard mill	1	720
- oil and fats industry	2	360
Workshop	1	540
Power sub-station and generator room	1	105
Pump room	1	25
Elevated water tank	1	-
Boiler room	1	35
Connecting corridor	2	453
Paddy storage test room		
- concrete silo	1	20
- corrugated steel silo	1	20
*- wooden warehouse	1	20
*- Bamboo-built temporary shed	1	20
*Paddy warehouse	1	231

Buildings	Quantity	Area (m^2)
*Canteen	1	112
*Guardman's room	1	3
*Staff quarter	1	183
*Director's residence	1	110
*Garage	1	60
*Paddy drying yard	-	-
*Pond	-	-
Total		5,462

Note: 1. The mark * indicates the facilities to be provided by Burmese side.

2. Facilities are subject to minior changes on considerations afterwards.

5-3-3 Space area of facilities

The space area of facilities is as follows;

1) Main building

Room	Area/person (m^2)	Capacity (person)	Estimated Floor space (m^2)	Actual use Floor space (m^2)
Director	21/p	1	21	21
Dy. director	21/p	1	21	21
Reception	3.5/p	12	42	42
Office	7.5/p	24	180	186
Seminar	2.0/p	60	120	126
Economic study	7.5/p	7	72.5	84
Milling test lab.	15/p	2	30	27
Grain analysis lab. (Physical)	22/p	7	154	156
Grain analysis lab. (chemical) + Pest control	22/p	8	176	168
Oil lab.	22/p	6	132	144
Drafting	5.6/p	2	31.2	36

Room	Area/person (m^2)	Capacity (person)	Estimated Floor space (m^2)	Actual use Floor space (m^2)
Library	2.5/p	60	150	144
Experts (visitor)	17/p	5	85	84
Utilities	4/p	3	24	24
Lavatory	-	50 - 100	40	42
Storage	15%	-	55	48
Others	30%	-	400	372
Total			1,733.2	1,725

2) Testing room (dryer, parboil)

Equipment, materials and others $20 \times 36 = 720m^2$

3) Testing room (comparative rice mill, standard rice mill)

Equipment, materials and others $20 \times 36 = 720m^2$

4) Testing room (oil and fats industry)

Equipment, materials and others $10 \times 24 = 240m^2$

- " - $10 \times 12 = 120m^2$

Total 360m

Note: This room is divided into two because of such accident as fire etc.

5) Workshop

Equipment, development materials, spare part for repair and others

$15 \times 36 = 540m^2$

6) Power sub-station and generator room

Sub-station, generator etc. $7 \times 15 = 105m^2$

Note: The room is divided into two

7) Paddy warehouse

Paddy for testing $38.5 \times 6 = 231m^2$

8) Pump room $5 \times 5 = 25m^2$

9) Elevated water tank -

10) Boiler room $.5 \times 7 = 35m^2$

11)	Paddy storage test room	
	Concrete silo	$4.5 \times 4.5 \fallingdotseq 20m^2$
	Corrugated steel silo	$2.5^2 \times 3.14 \fallingdotseq 20m^2$
	Wooden warehouse	$4.5 \times 4.5 \fallingdotseq 20m^2$
	Bamboo-built shed	$4.5 \times 4.5 \fallingdotseq 20m^2$
12)	Canteen	
	Dining room, kitchen, lavatory etc.	$7 \times 16 = 112m^2$
13)	Guardman's room	$1.8 \times 1.8 \fallingdotseq 3m^2$
14)	Staff quarter	$92 + 54 + 37 = 183m^2$
15)	Director's residence	$110m^2$
16)	Garage	$5 \times 12 = 60m^2$
17)	Paddy drying yard	$2 \times 20 \times 50 = 2,000m^2$
18)	Pond	$65 \times (65 + 62)/2 = 4,120m^2$
19)	Others: road, gate, fence etc.	
20)	Connecting corridors	

5–4 Arrangement Plan of Buildings

In planning the arrangement of buildings, considering the climatic conditions in Burma, most important is to shut off the sunlight in the morning and evening. Therefore, all of the buildings should be arranged on east-west axis and lighting from south-north.

However, the Post-harvest Technology Training Center building being already there in the same compound, it is necessary to consider the location of this building in planning the arrangement.
Axis of the proposed buildings were placed in line with this building.

Further, with emphasis on the function of communication between the main building and test rooms etc., spacing between them were made as near as possible.

While the major access road is Parami road, considering the future possibility of building a flyover along this road, provision was made for constructing additional access road on the east side of the proposed site. Two roads were planned within the compound considering emergency escape.

Three alternatives arrangement plans, A, B and C, were made as were depicted on the next page.

Plan A has the main building of two stories, located in the center of the compound and situated South to North.

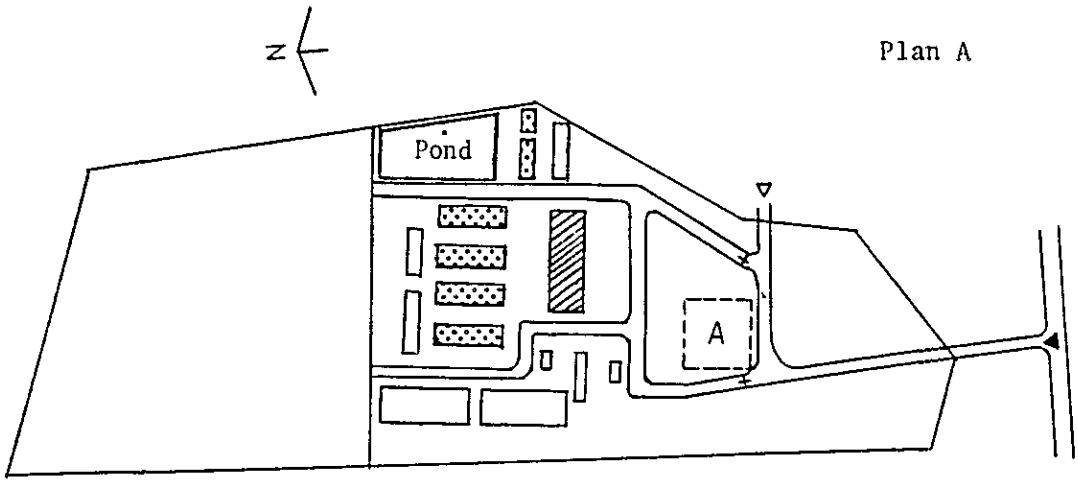
The roads are complicated and not in a straight line. Further, the space where the pond is to be dug is narrow and soil for filling up is in short.

Meanwhile, test room buildings are divided into four separate ones, providing good natural ventilation.

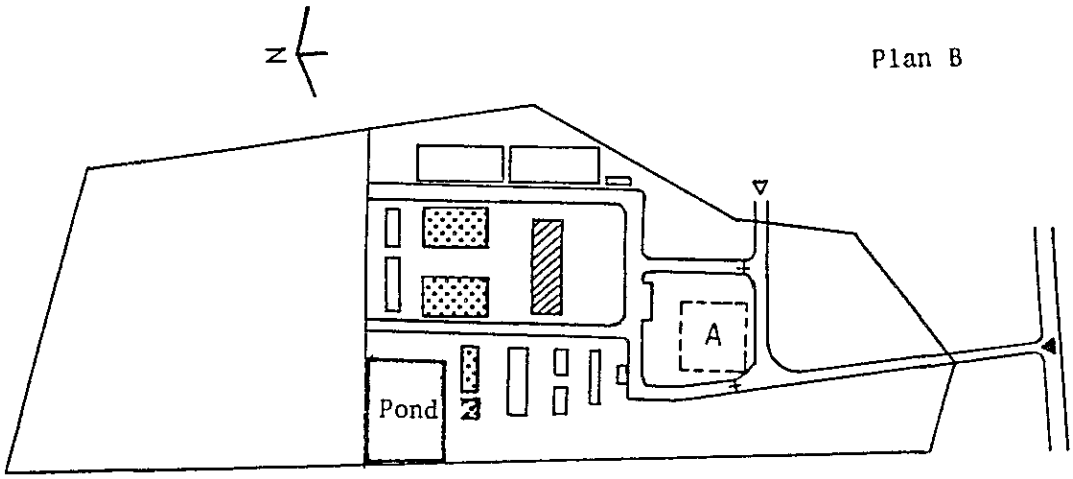
Plan B has also the main building of two stories, located in the center of the compound. Test room buildings are combined into two separate ones, instead of four, to save the construction cost.

Due to poor soil conditions, the two-storied main building in plans A and B is considered as problematical because of mounting construction cost etc.

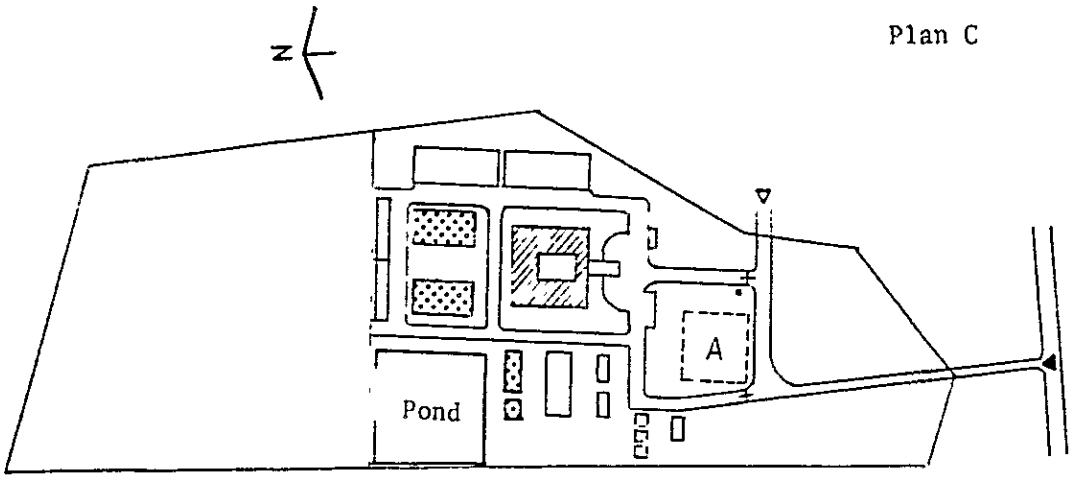
Plan A



Plan B



Plan C



Main building | Testing rool building | A Post-harvest Technology Training Centre

Meanwhile, there is land space for digging ponds further, facilitating future soil take-out. Each of the roads should preferably be arranged nearly in a straight line.

Plan C eliminates above-mentioned difficulties, with the main building of one-story to overcome the poor soil conditions. Test room buildings are located in proximity with the main building, similar to Plan B. The location of a pond is also arranged alongside the compound, reviewing features of Plan B.

Consequently, in spite of a spacious compound, the proposed buildings are centralized into a compact location, in conformity with the existing training center on the south side.

The final arrangement of buildings, which is Plan C, is to locate the main building in the center of the compound, placing two test room buildings and paddy storages in the north, and disposing workshop, oil testing room and living quarters in the west.

5-4-1 Building

Proposed plan of PTAC comprises a one-story main building and one-story buildings (4 test room buildings, workshop, paddy warehouse, boiler room, electrical installations, emergency power generating room, garage, canteen, living quarters, guard room). Compared with Japan, horizontal force due to earthquake and wind in Burma is relatively small, but cannot be disregarded. Further, the soil conditions are generally poor, and the building site is in the worst.

The plan needs to take into account required elements of indoor environment and local climatic conditions.

As the dry and rainy seasons are distinctly divided in the proposed area, the effects of sunlight, ventilation and rain on buildings are significant.

1) Roof

The roof, greatly affected by sunlight, needs to protect against strong sunlight and heavy rain. Further, to protect the indoor

from radiant heat, it is considered essential to provide thermal insulation layer in between the roof and interior.

In the case of concrete construction, it might be also effective to provide air space as thermal insulation layer below the roof, that could be slate roofing on top of roof floor, to protect the interior from radiant heat.

The roofs of main building and test room buildings should be asbestos-slated, while these buildings shall be one-storied steel structure considering poor soil conditions, maintenance skill, reduction in construction period and other local conditions.

2) Wall

The exterior wall is also greatly affected by sunlight and rain. While the material of large resistance of heat transmission is to be used, one of the effective means is to provide eaves or louvers for protection against sunlight. However, it is recommended to provide natural ventilation system with cased opening, utilizing monsoon wind.

The exterior wall of main building is made of 25cm thick brick work, with partition walls made of 11.25cm thick brick work or wooden wall. Parts of the wall is mortar work with paint finish.

Exterior walls for other buildings are to be of slate.

3) Floor

As the proposed site is liable to be submerged by occasional downpours during the rainy season, the floor level needs to be determined freed from submergence.

The main building should employ the raft floor, due to poor soil condition. Such floor is easy to construct through employing foundation beams of Rahmen structure.

Other buildings are to be of reinforced concrete floor mold, except for heavy equipment and vibrating machinery which need to be installed on independent foundations.

Finish of main building floor should be of concrete finish, with the interior floor made of concrete and mortar finish. Floors of test room buildings and other building shall be made of concrete with mortar finish.

Direct foundation is to be employed with the supporting layer of silt and clay (N-value of 5), 1,500mm below the ground level.

4) Ceiling

The ceiling is to be provided only in places where the special need may call for, and is made of asbestos plate or teak.

5) Drying yard

The drying yard is to be levelled and overlayed with mixture of clay and cow dung. It needs to be repaired annually.

6) Pavement will be limited to the major areas of the site where found specially needed.

Consequently, it is well to say that the adoption of design and building practice matching with the local climate and technical level is considered as the best. This is likely to lead to prolonged life of the buildings. However, on account of limited construction schedule, it is necessary to import steel bars, steel structure, equipment etc.

5-4-2 Electrical installations

The electrical installation program comprises high-voltage equipment (power receiving facility, power generating equipment, power circuits, lighting and receptacles) and low-voltage equipment (telephone system, inter-com system, loud speaker system, TV receiving system, fire alarm system), with details as mentioned below:

1) Power receiving facility

The incoming power will be dropped from three-phase, 3W, 6.6KV down to thee-phase, 4W, 230/400V. The circuits used for power are to be of three-phase 400V and those for lighting are of single-phase 230V. Transformer capacity installed at the

sub-station is to be of 500KVA, considering the estimated electrical load (Page).

Considering incoming voltage fluctuation exceeding 10%, the AVR (automatic voltage regulator) will be provided.

2) Power generating equipment

In order to cater for occasional power failures presently taking place in the site, the emergency power generating equipment will be provided chiefly to serve the main building. Its main particulars are:

Rated output	50KVA
Rated voltage	Three-phase, 4W, 400V/230V
Frequency	50HZ
prime mover	Diesel engine
Cooling system	Water-cooled radiator type

3) Power circuits

Power circuits for general use and for testing rooms are to be provided, with three-phase 400V.

4) Lighting and receptacles

The lighting used should be mostly fluorescent lamps, along with incandescent lamps installed in places.

Switches will be fitted in the entrances of respective rooms, so as to make selective switching of window-side and interior lights.

Receptacle outlets will be generally 230V, while measuring instruments and others designed for different voltages (such as 100V) should be served in combination of transformers.

Illumination standards used follow generally JIS rules, because of the absence of comparable standards in Burma.

The major standards applying to the project are:

Building	Room	Illumination (Lx)
Main building	Laboratories	500 - 700
	Office, conference room	300 - 500
	Corridor etc.	100 - 150
Other buildings	Testing room	200 - 300
	Other rooms	100 - 200

5) Telephone system

The main building will have a telephone terminal board, along with the small switchboard. Telephone receivers are to be provided in the main building (each one at director's room, library, economy and marketing room, and grain inspection laboratory, two at office) and also in respective test room buildings.

6) Inter-com system

The inter-com system will be provided for communication in between the main and other buildings.

7) Loud speaker system

The main building will have loud speakers and amplifier, while other buildings will have trumpet type speakers, for inter-building addressing purpose.

8) TV receiving system

The TV antenna will be installed on the roof top of the main building, and the outlets are to be provided in the director's room, deputy director's room, library, conference room etc.

9) Fire alarm system

Alarm bell system, with push-button controls, will be provided to assist in the fire fighting actions.

5-4-3 Water supply and drainage installations

1) Water supply

The water supply will be done by branching from the main water piping network (8" pipe along Kabaye Pagoda road) of Rangoon City Development Commission.

While the daily water consumption is estimated as $12m^3$, it is considered necessary to provide the storage tank of $25m^3$ capacity (for 2-day consumption), anticipating the occasional shortage of water supply without relying upon the well water.

2) Sewage

The waste water and sewage will be separately drained off the buildings. The waste water, after treated by purifier (100-people treatment), will be drained into the adjacent creek, by pumping up. Acid and alkali sewage which is supposed to be small quantities should be diluted and drained off.

3) Fire fighting system

The outdoor hydrants will be provided, utilizing water from the pond, via booster pump. Each of six nos. hydrants is fitted with two hoses of 30m long each and a nozzle, along with push-button switch for operating the pump.

5-4-4 Air conditioning equipment

The buildings will not be provided with air cooling system network. But air/water-cooled package type air cooler may be installed in the required rooms of main and other buildings.

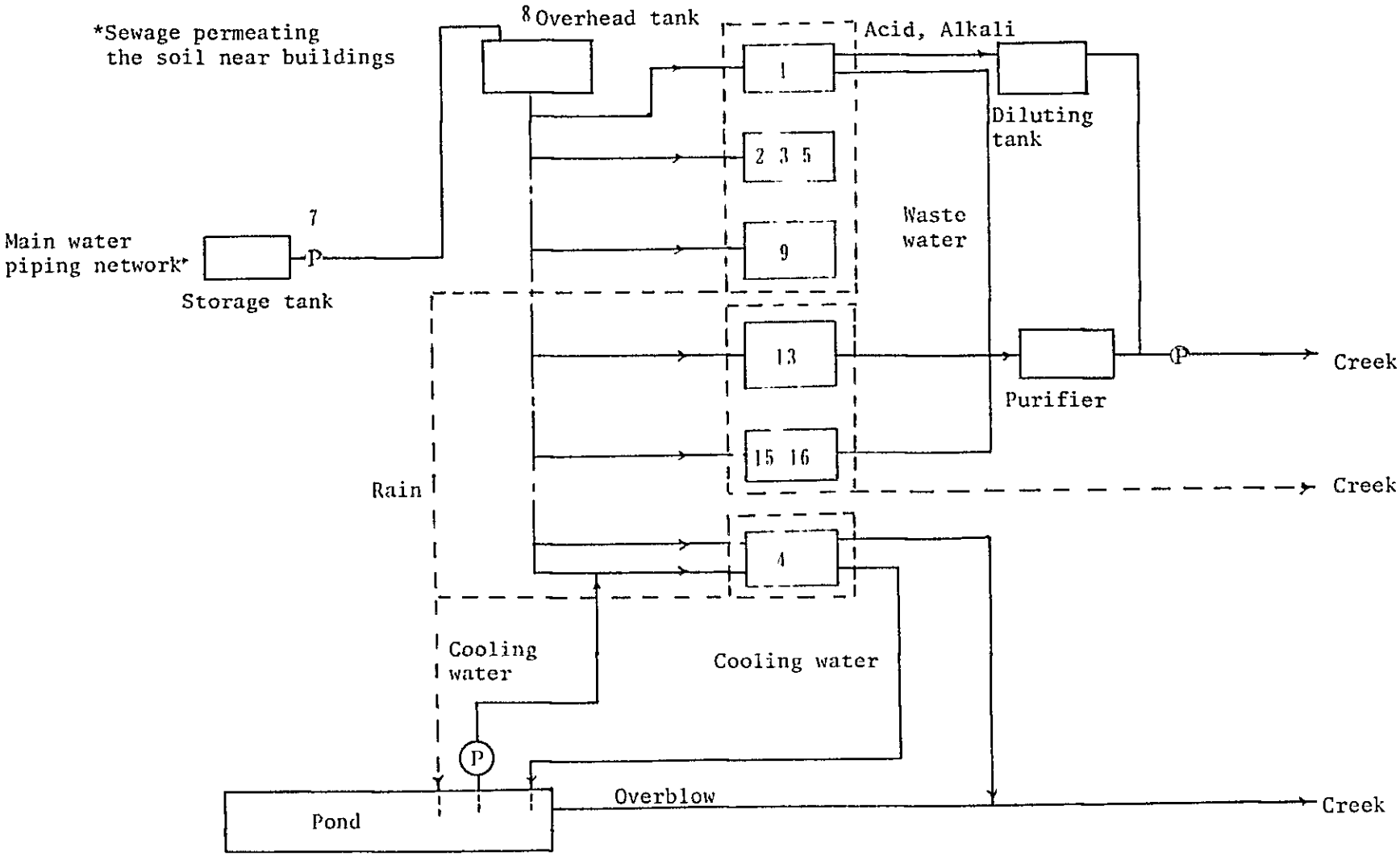
1) Air cooling system

Major rooms of the main building will be furnished with air cooling system.

2) Ventilation system

In the major rooms of the main building and at the other required places will be installed. Lavatory etc. will be provided with draft fans.

5-4-5 Flowchart of Water Supply and Sewage



5–5 Boring Data

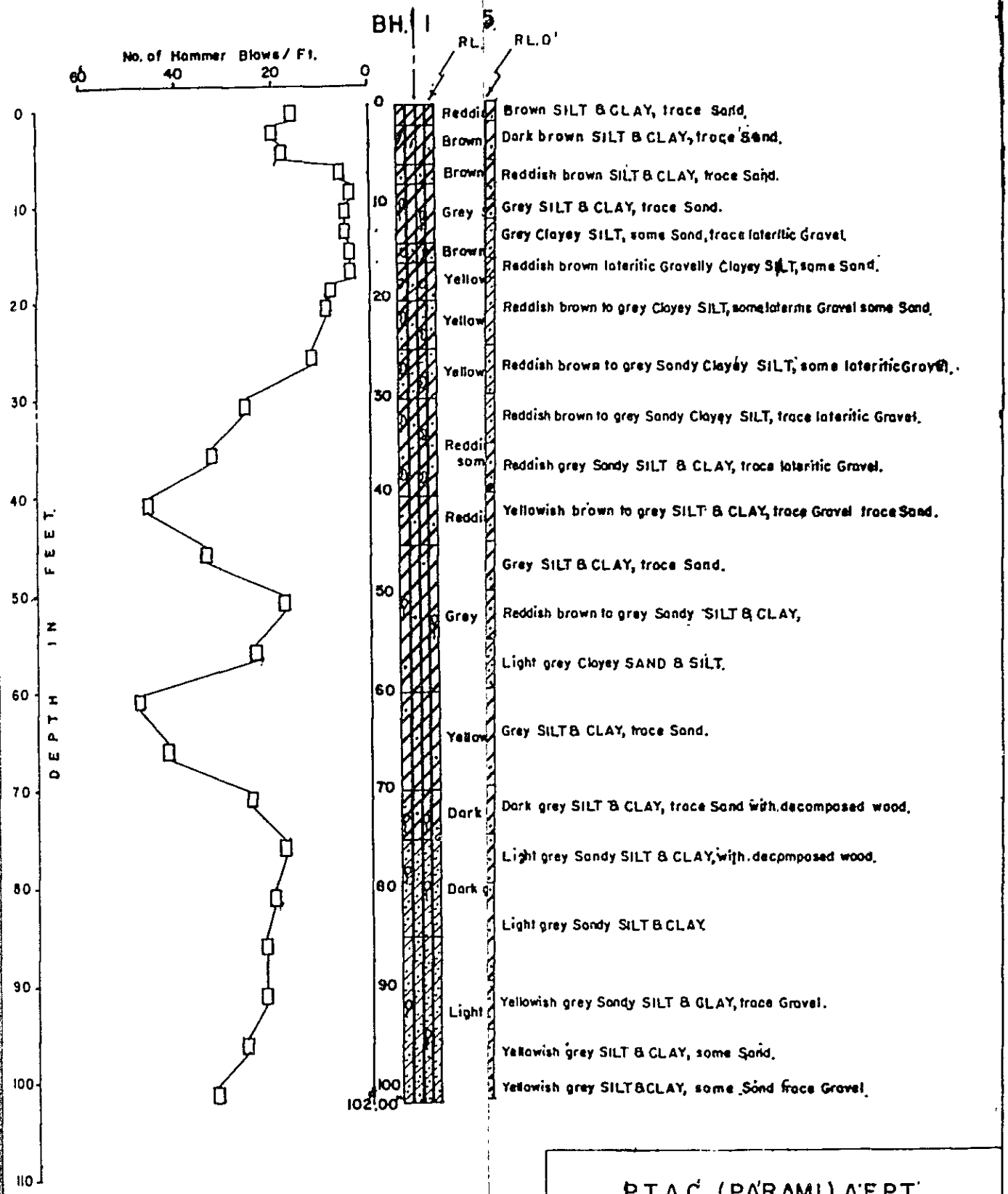
BH - 1

BH - 2

BH - 3

BH - 4

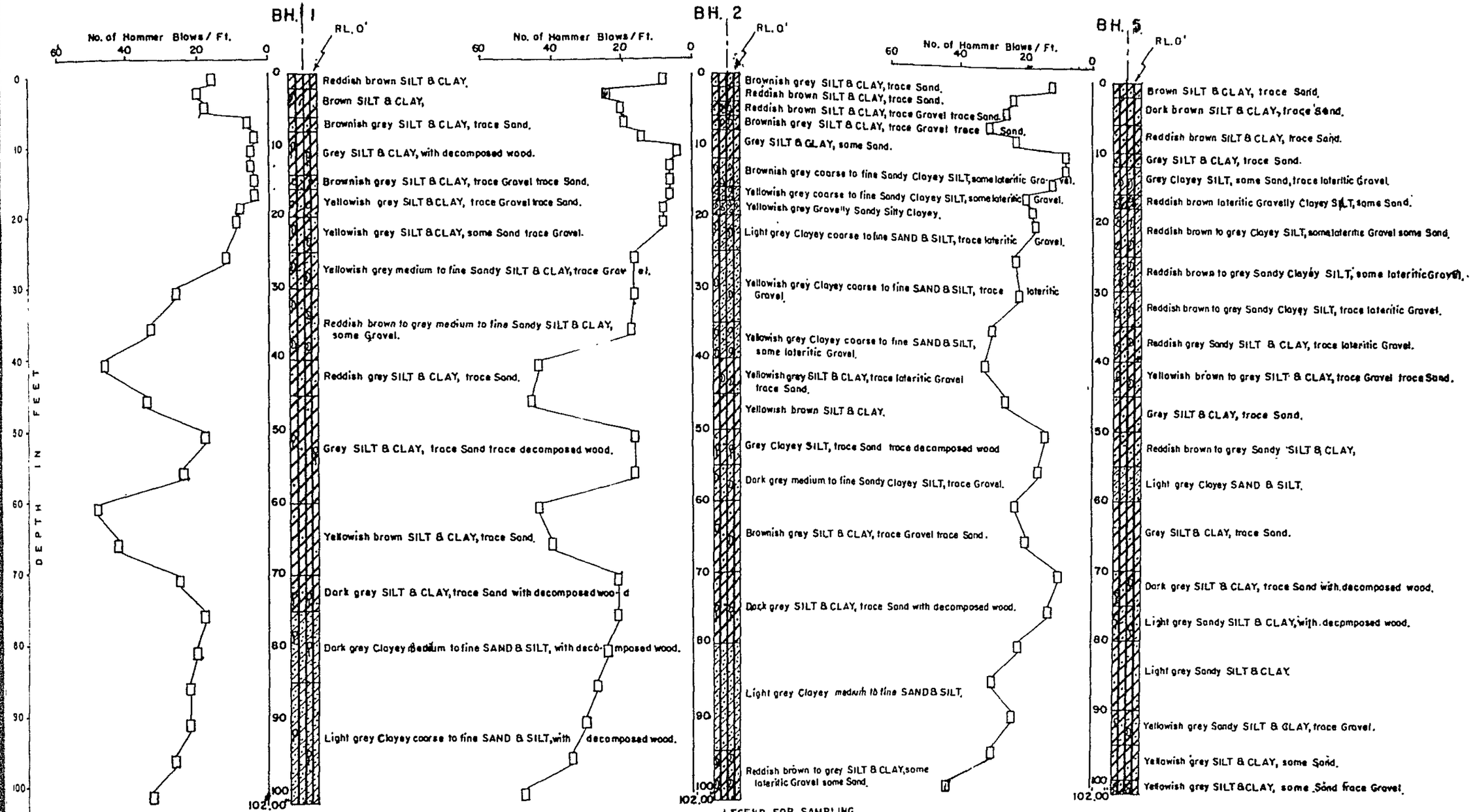
BH - 5



P.T.A.C. (PARAMI) A.F.P.T.

PROFILE OF BORE HOLES
RESEARCH AND SOIL TESTING LABORATORIES
CONSTRUCTION CORPORATION

DRAWN BY: SOE TINT OO II CHECKED BY: KAN AYE SO III	DATE AUG. 82	FIGURE No. 2-1



LEGEND FOR SAMPLING

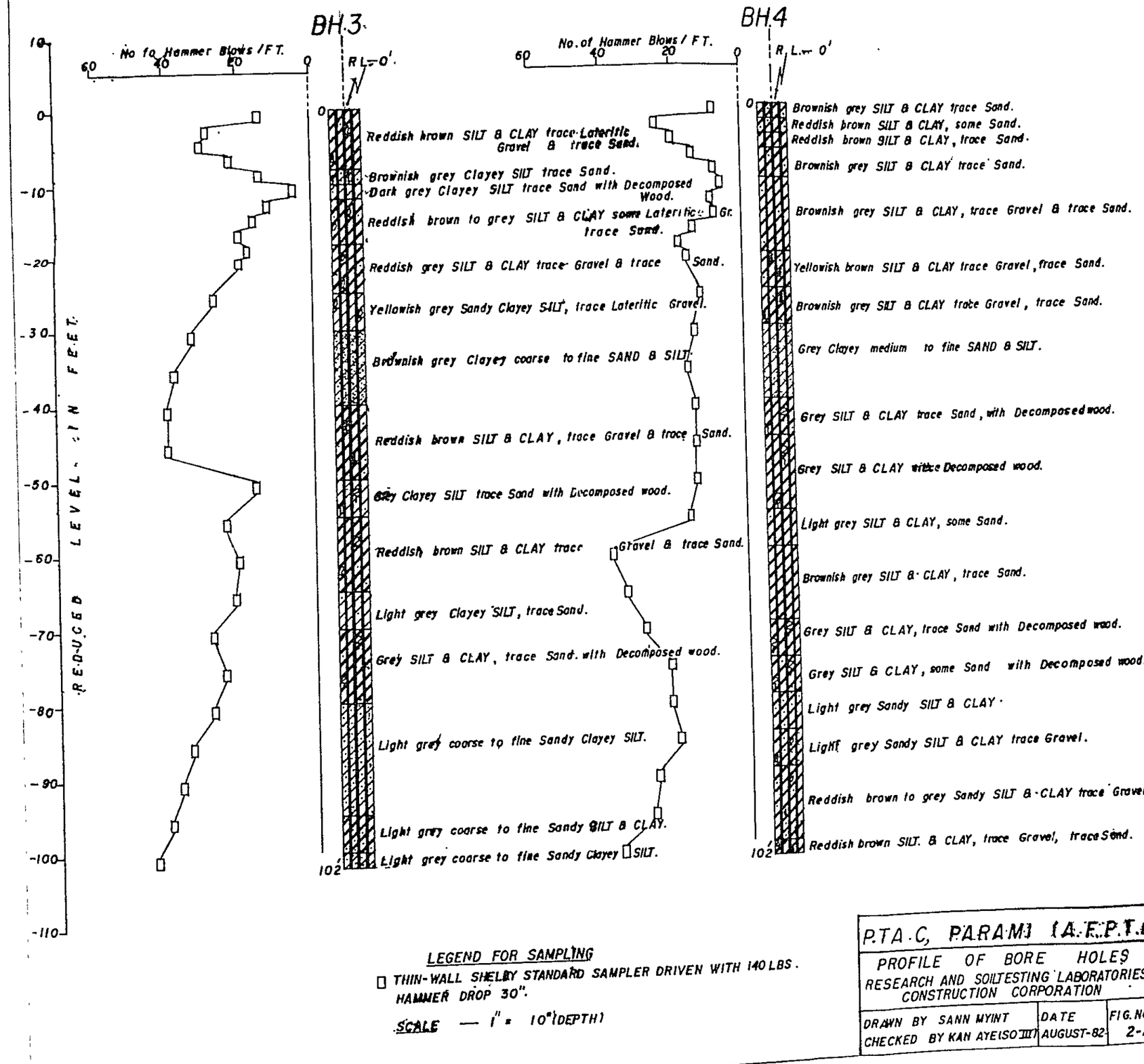
THIN-WALL STANDARD SHELBY SAMPLER DRIVEN WITH 140 LBS HAMMER DROP 30"

SCALE: 1" = 10' (DEPTH OF BORE HOLES)

P.T.A.C. (PARAMI) A.F.P.T.

PROFILE OF BORE HOLES
RESEARCH AND SOIL TESTING LABORATORIES
CONSTRUCTION CORPORATION

DRAWN BY: SOE TINT DAW	DATE	FIGURE No.
CHECKED BY: KAN AYE SO	AUG. 82	2-1



LEGEND FOR SAMPLING

□ THIN-WALL SHELBY STANDARD SAMPLER DRIVEN WITH 140 LBS. HAMMER DROP 30".

SCALE — 1" = 10' (DEPTH)

P.T.A.C, PARAMI (A.F.P.T.C.)

PROFILE OF BORE HOLES

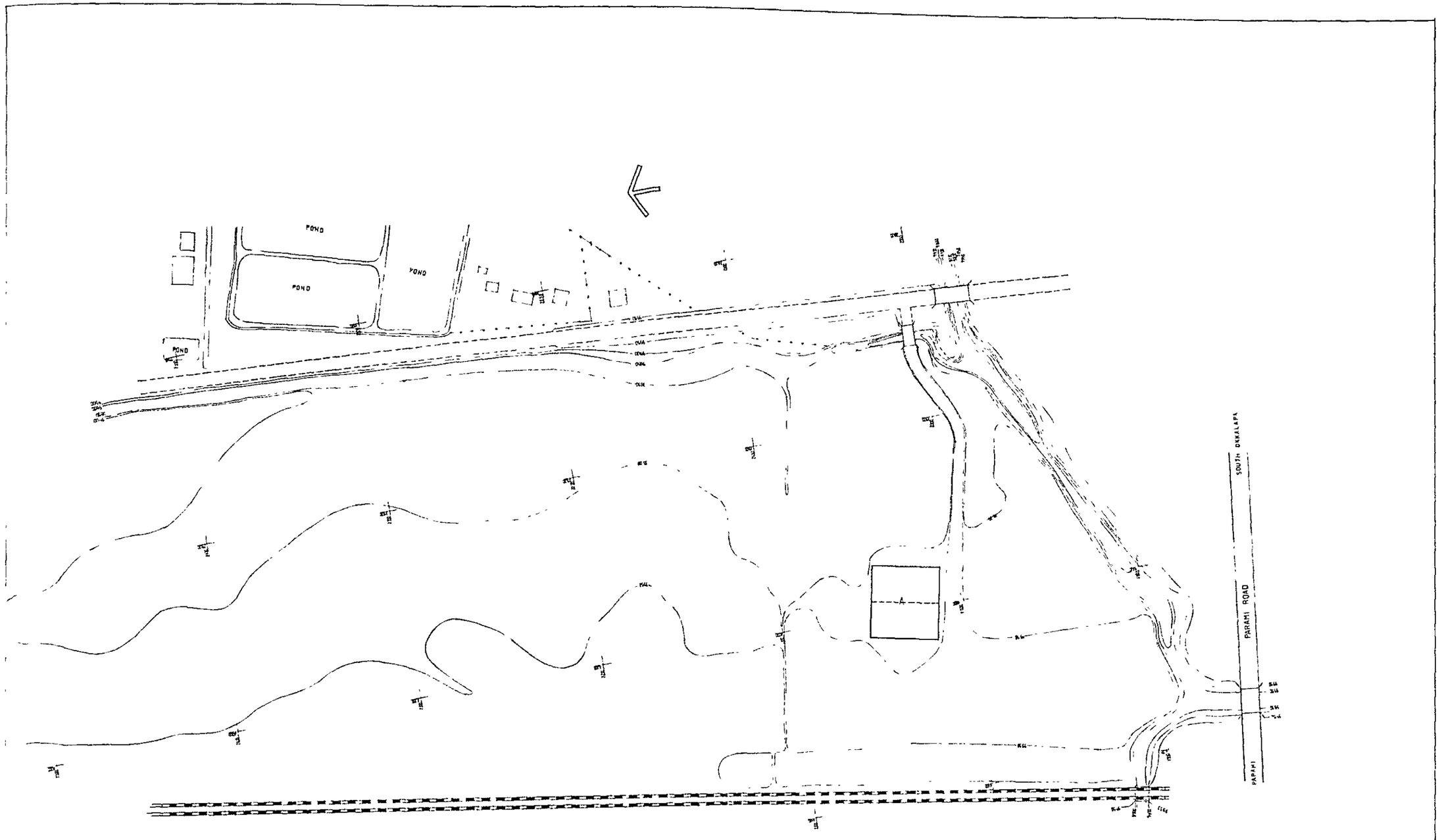
RESEARCH AND SOILTESTING LABORATORIES CONSTRUCTION CORPORATION

DRAWN BY SANN MYINT CHECKED BY KAN AYE(SO III)	DATE AUGUST-82	FIG. No. 2-2

5-6 Basic Design Drawings

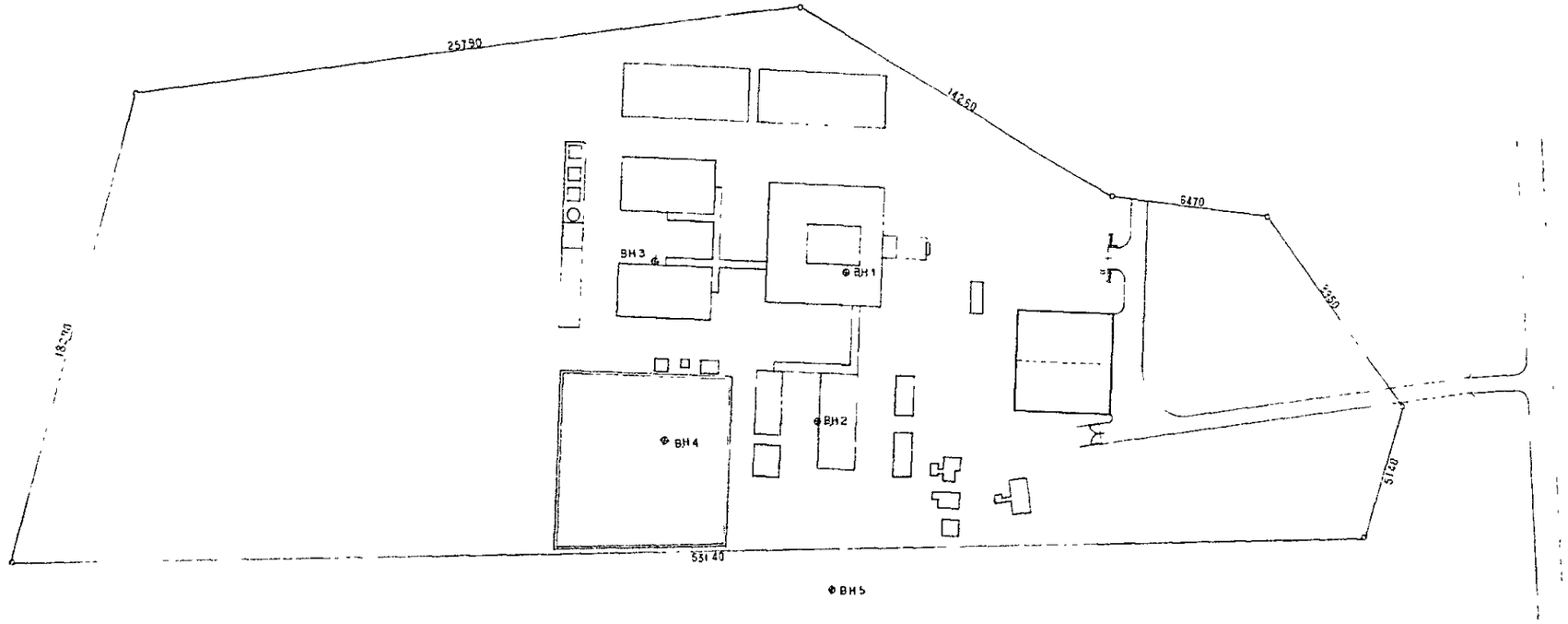
List of Drawings

1.	Post-harvest Technology Application Centre	- Topographical survey plan
2.	do.	- Bore hole location plan
3.	do.	- Filling plan
4.	do.	- Block plan
5.	do.	- Main building floor plan
6.	do.	- Elevation, Section
7.	do.	- Dryer testing & parboil testing room, Comparatives rice milling & standard rice mill testing room, Oils and fats industrial testing room
8.	do.	- Workshop, Sub-station and generator room, Pumping room
9.	do.	- Connecting corridor
10.	do.	- Boiler room, Concrets silo, Corrugated steel silo
11.	do.	- Paddy storage, Canteen, Guardman's room
12.	do.	- Director's residence floor plan, Personnel quarter (caretaker) floor plan
13.	do.	- Personnel quarter (janitor) floor plan, Personnel quater (driver) floor plan, Garage floor plan
14.	do.	- Pond, Drying yard, Gate



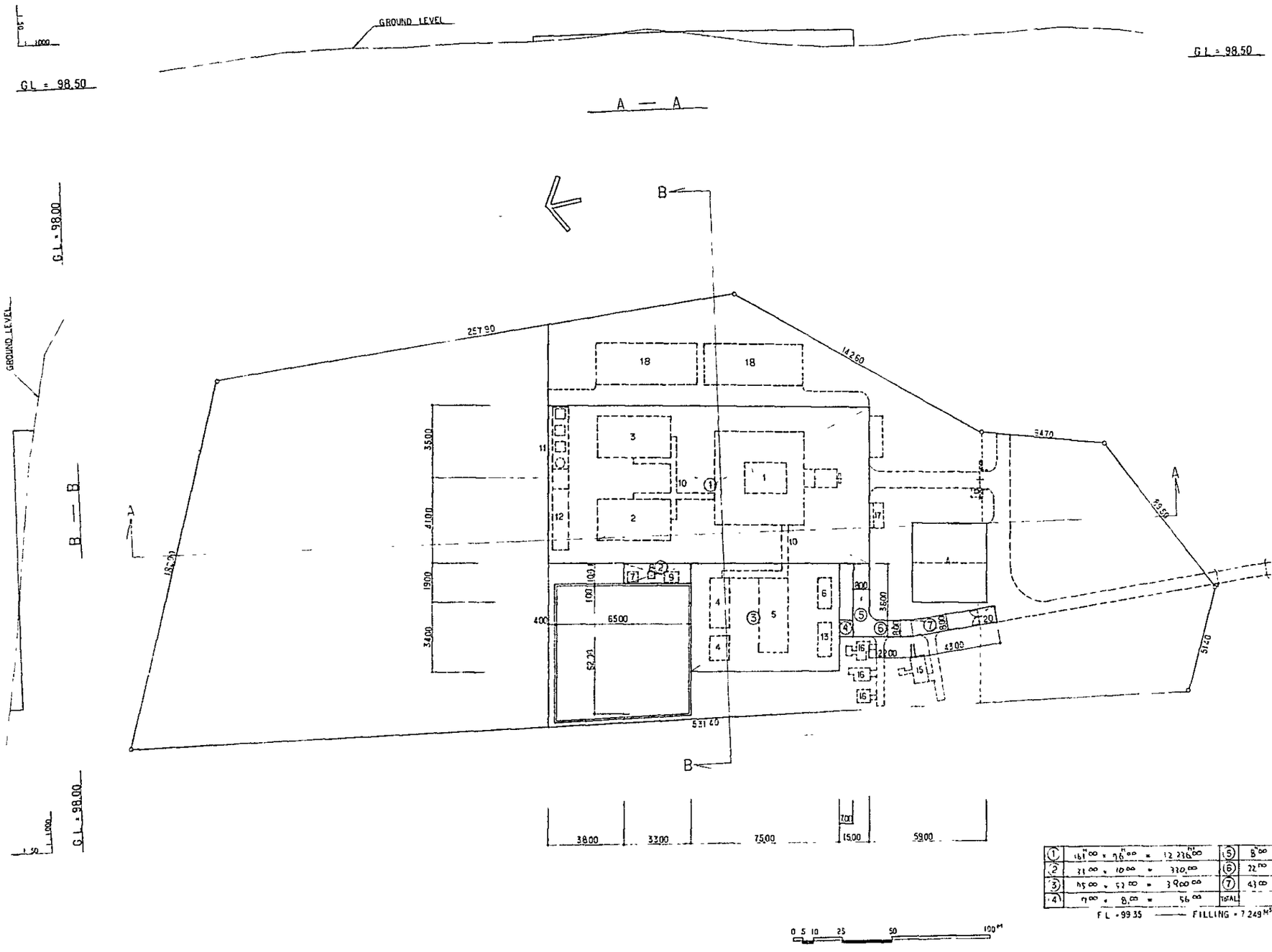
POST-HARVEST TECHNOLOGY APPLICATION CENTRE
TOPOGRAPHICAL SURVEY PLAN

1



0 5 10 25 50 100m

POST-HARVEST TECHNOLOGY APPLICATION CENTRE
BORE HOLE LOCATION PLAN

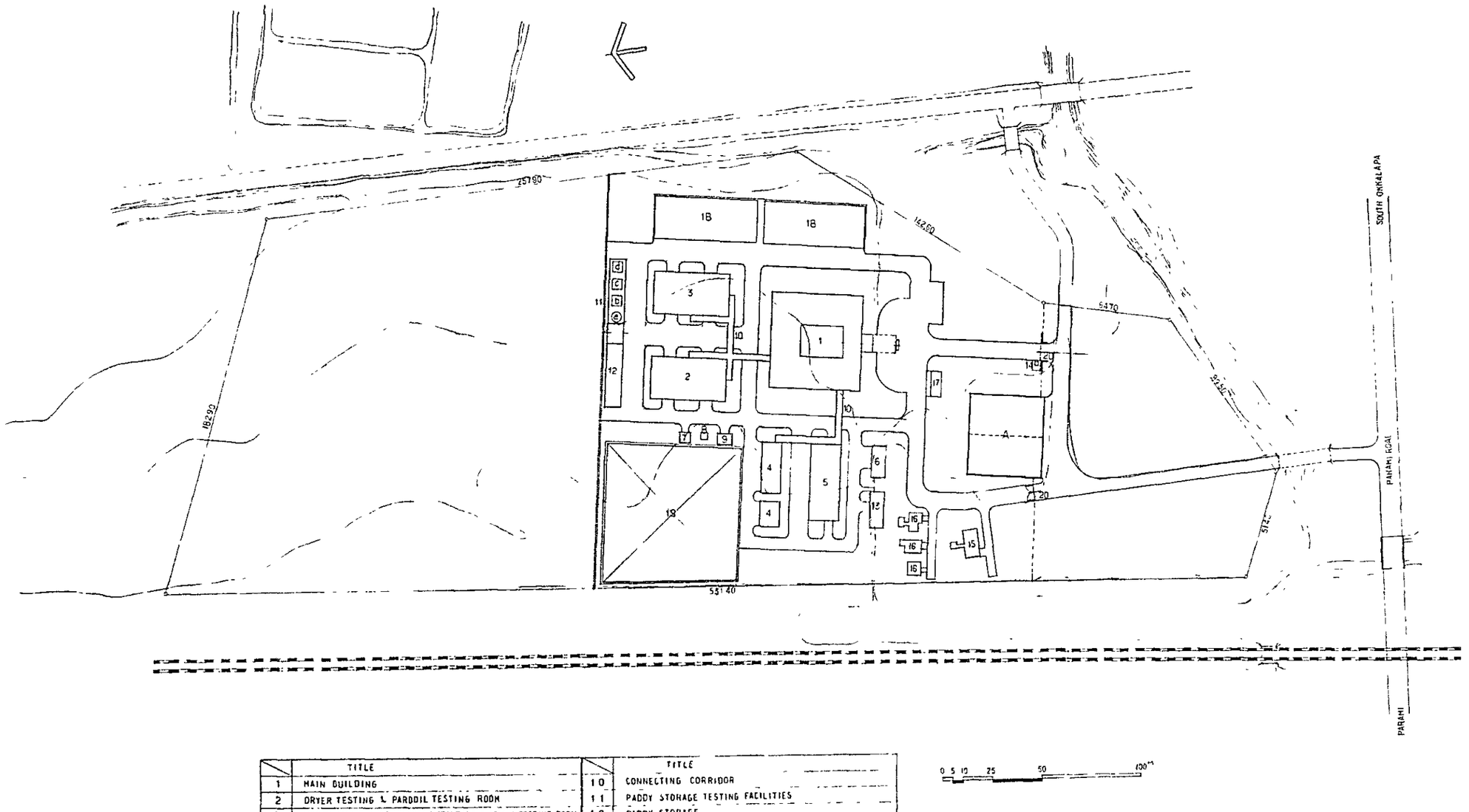


①	16.00 × 76.00 = 1216.00	⑤	8.00 × 36.00 = 288.00
②	21.00 × 10.00 = 210.00	⑥	22.00 × 8.00 = 176.00
③	75.00 × 52.00 = 3900.00	⑦	43.00 × 8.00 = 344.00
④	7.00 × 8.00 = 56.00	TOTAL	17330 M²

FL = 99.35 —— FILLING = 7249 M³

0 5 10 25 50 100 M

POST-HARVEST TECHNOLOGY APPLICATION CENTRE
FILLING PLAN

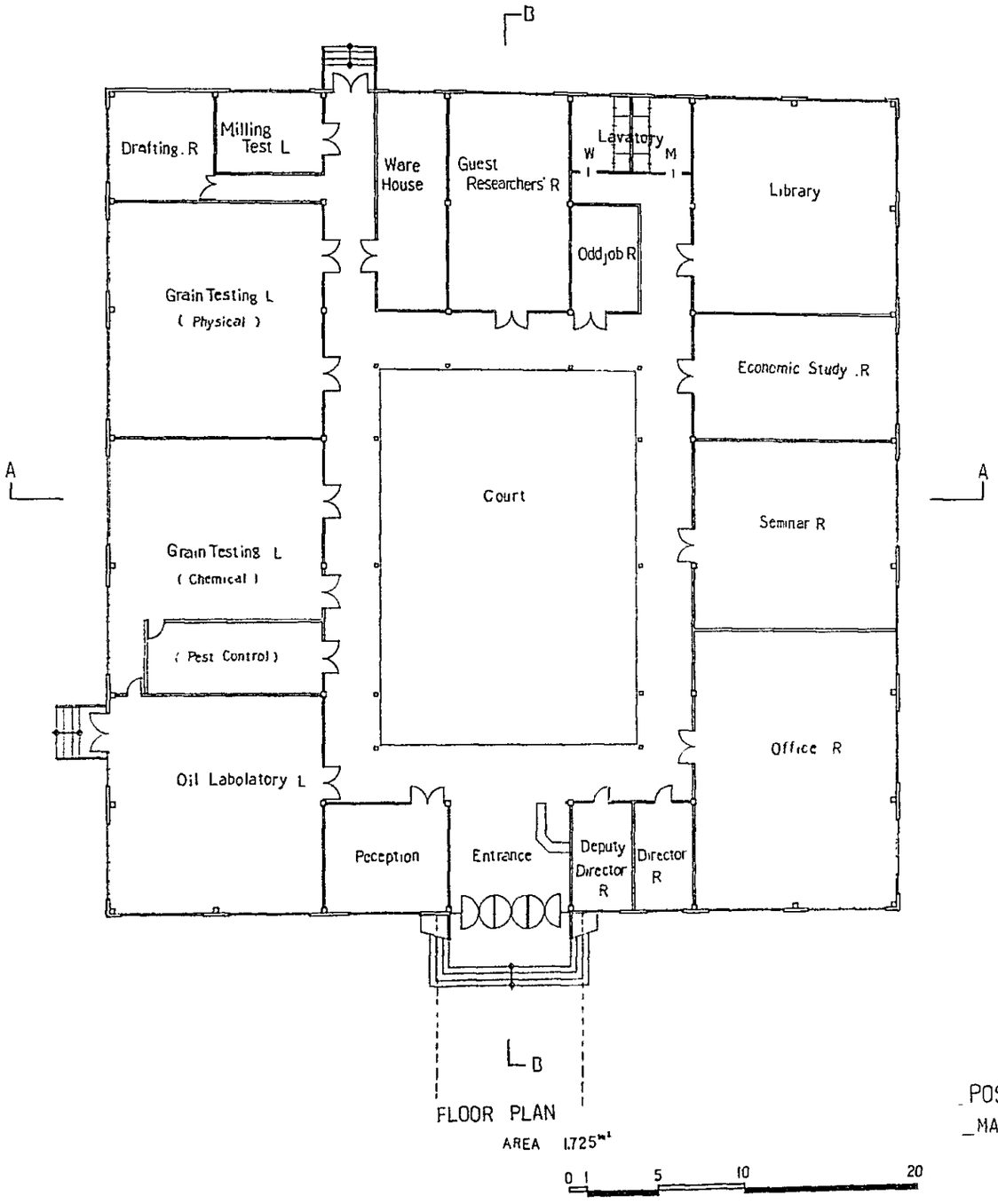


	TITLE
1	MAIN BUILDING
2	DRYER TESTING & PARBOIL TESTING ROOM
3	COMPARATIVE RICE MILLING & STANDARD RICE MILL TESTING ROOM
4	OILS AND FATS INDUSTRIAL TESTING ROOM
5	WORKSHOP
6	SUB STATION AND GENERATOR ROOM
7	PUMPING ROOM
8	HIGH WATER TANK
9	BOILER ROOM

	TITLE
10	CONNECTING CORRIDOR
11	PADDY STORAGE TESTING FACILITIES
12	PADDY STORAGE
13	CANTEEN
14	DIRECTOR'S RESIDENCE
15	PERSONNEL QUARTERS
16	PERSONNEL QUARTERS
17	GARAGE
18	DRYING YARD

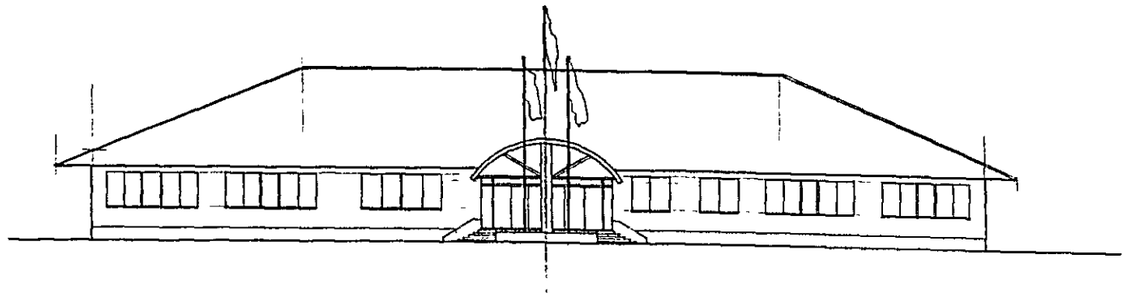
	TITLE
19	POND
20	GATE
A	TRAINING CENTRE

POST-HARVEST TECHNOLOGY APPLICATION CENTRE
BLOCK PLAN

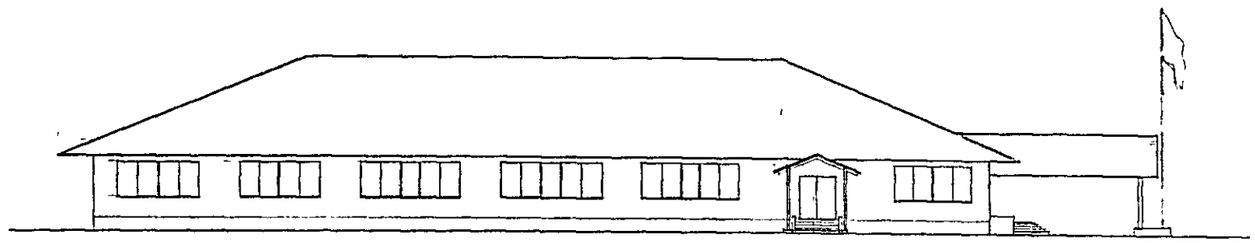


POST-HARVEST TECHNOLOGY APPLICATION CENTRE

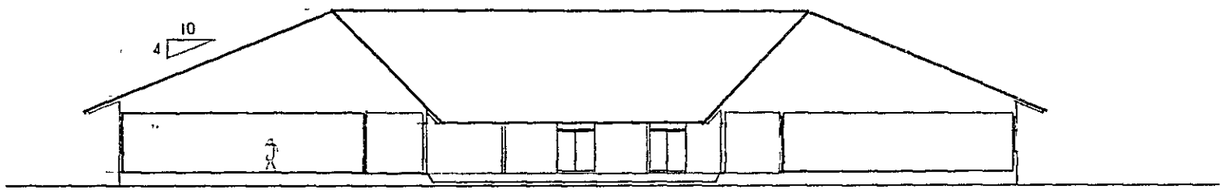
MAIN BUILDING FLOOR PLAN



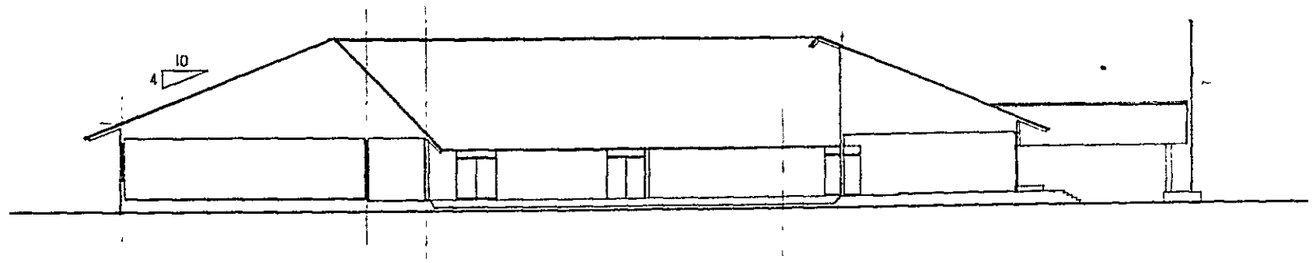
SOUTH ELEVATION



WEST ELEVATION



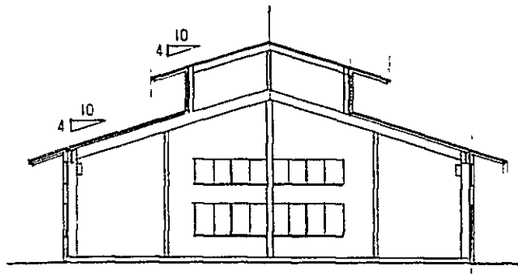
A–A SECTION



B–B SECTION

POST-HARVEST TECHNOLOGY APPLICATION CENTRE
ELEVATION, SECTION

0 1 5 10 20



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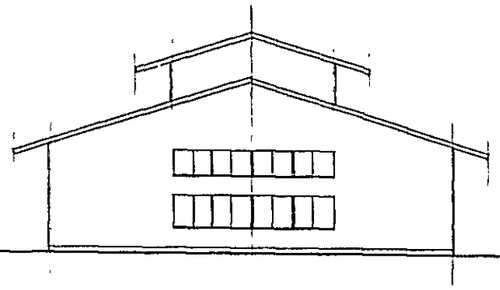
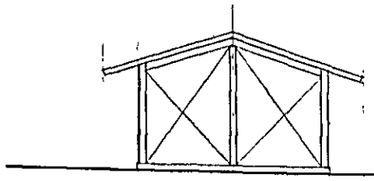
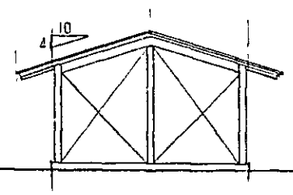


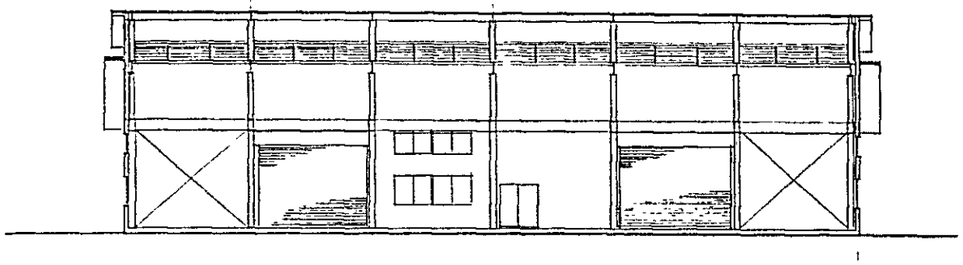
SIDE ELEVATION



SIDE ELEVATION



A–A SECTION



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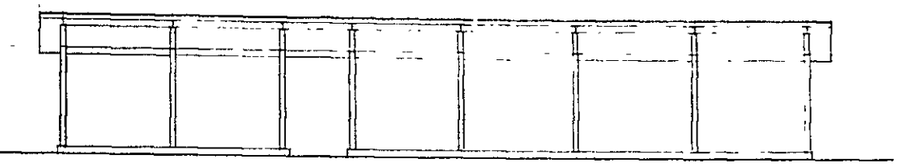
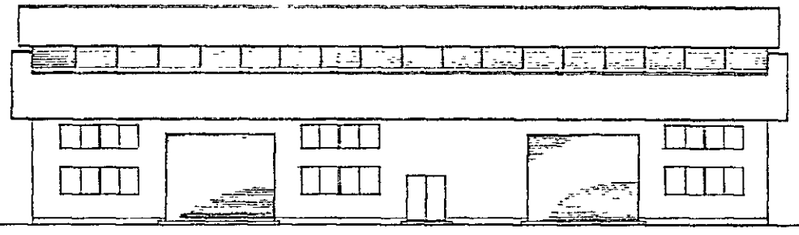
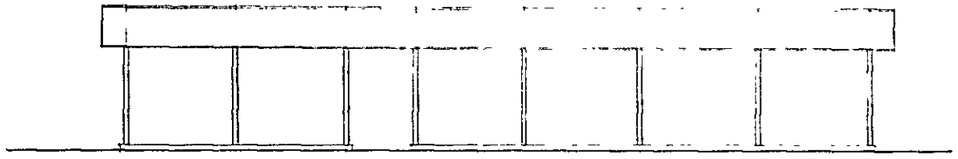


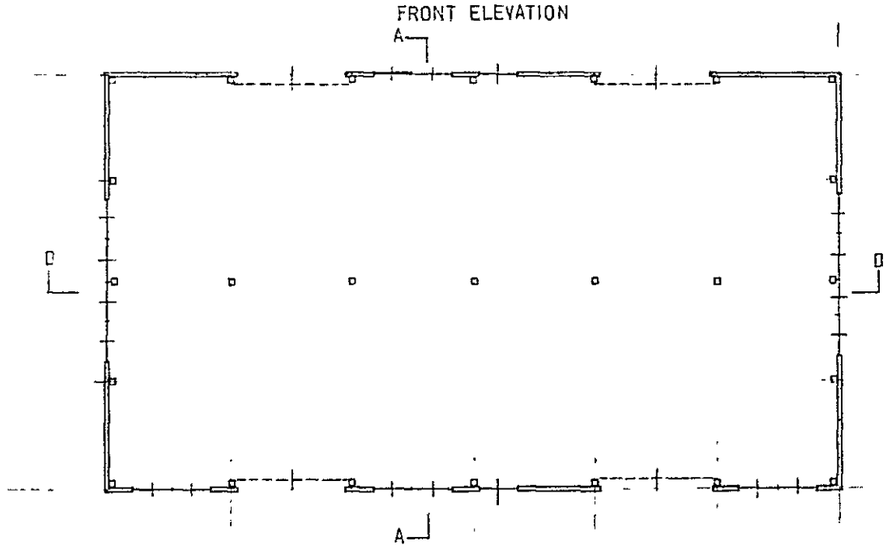
B–B SECTION



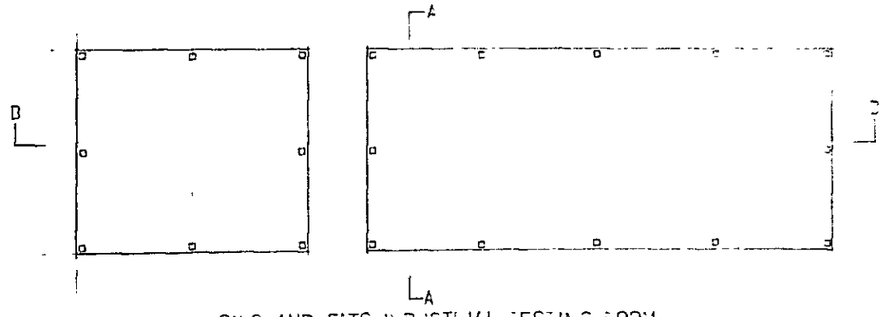
FRONT ELEVATION



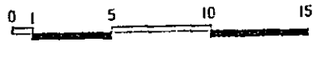
FRONT ELEVATION



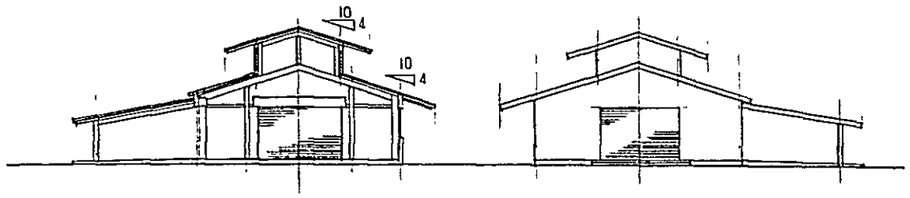
DRYER TESTING & PARBOIL TESTING ROOM
COMPARATIVS RICE MILLING & STANDARD RICE MILL TESTING ROOM
AREA : 720m²



OILS AND FATS INDUSTRIAL TESTING ROOM
AREA : 36[illegible]m²

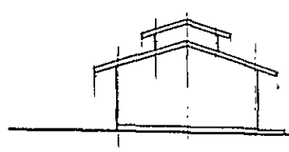


POST-HARVEST TECHNOLOGY APPLICATION CENTRE
DRYER TESTING & PARBOIL TESTING ROOM
COMPARATIVS RICE MILLING & STANDARD RICE MILL
TESTING ROOM
OILS AND FATS INDUSTRIAL TESTING ROOM

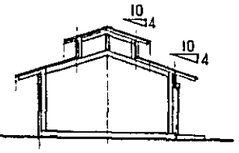


A-A SECTION

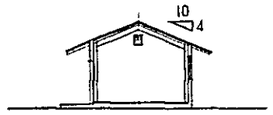
SIDE ELEVATION



SIDE ELEVATION



A-A SECTION



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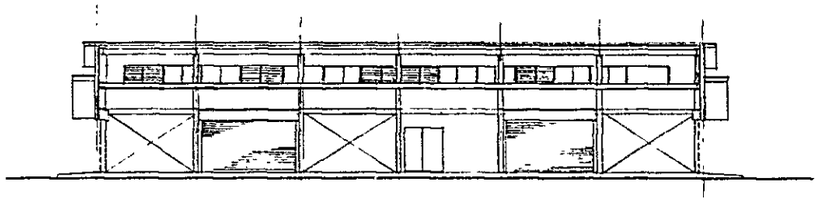
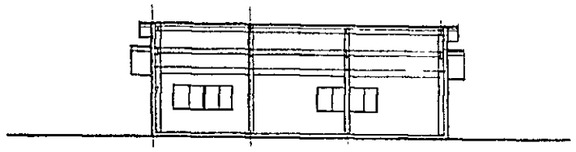
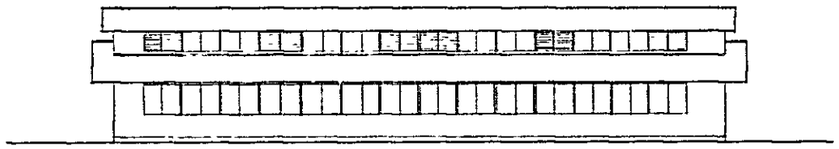


B-B SECTION

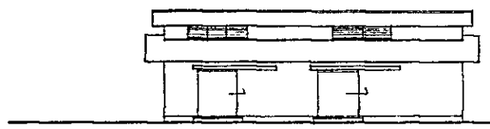


B-B SECTION

FRONT ELEVATION

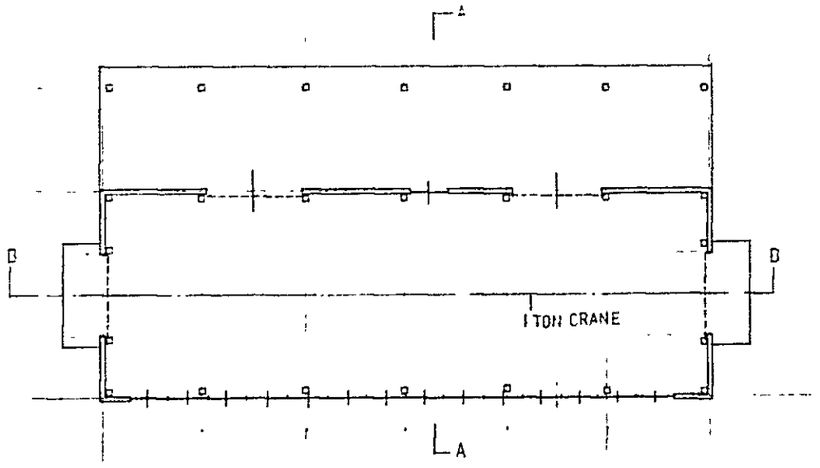


FRONT ELEVATION



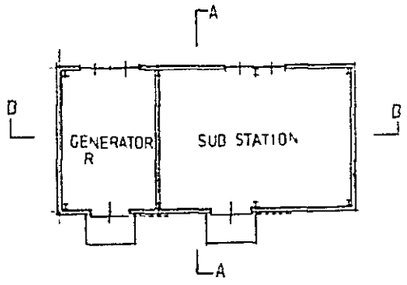
FRONT ELEVATION

SIDE ELEVATION



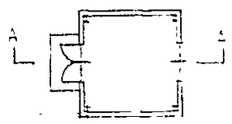
WORKSHOP

AREA : 450 m²



SUB STATION AND GENERATOR ROOM

AREA : 105 m²



PUMPING ROOM

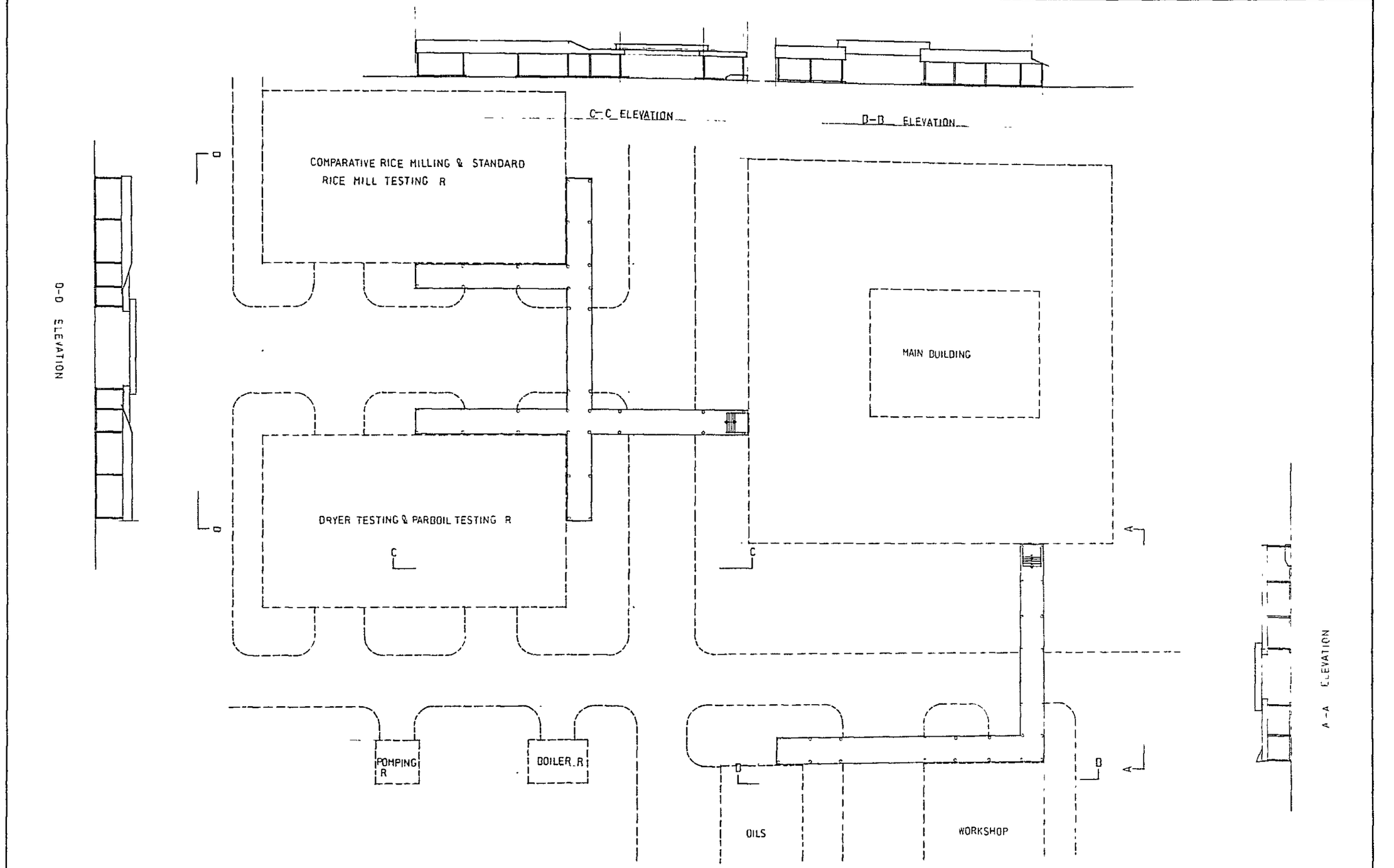
AREA : 25 m²

POST-HARVEST TECHNOLOGY APPLICATION CENTRE

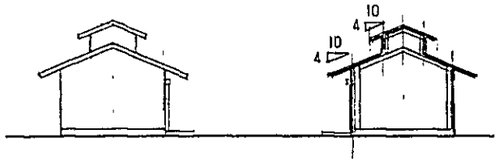
WORKSHOP

SUB STATION AND GENERATOR ROOM

PUMPING ROOM

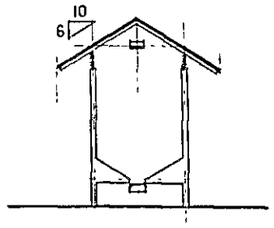


POST-HARVEST TECHNOLOGY APPLICATION CENTRE
CONNECTING CORRIDOR

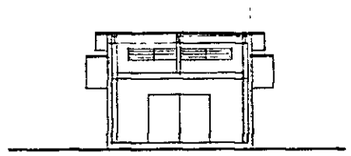


SIDE ELEVATION

A–A SECTION



A–A SECTION



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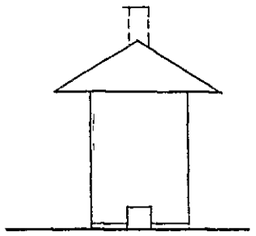
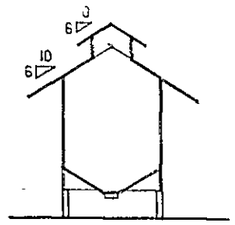


SIDE ELEVATION



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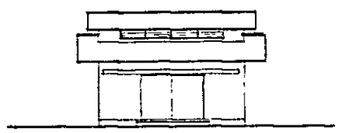

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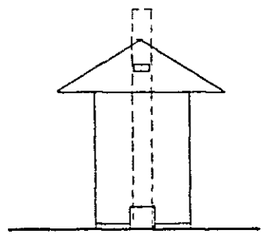

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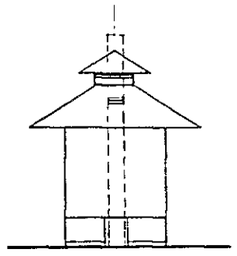

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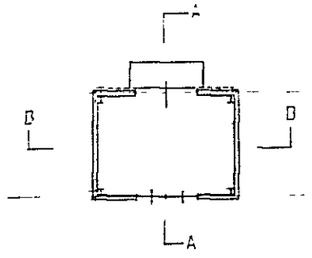
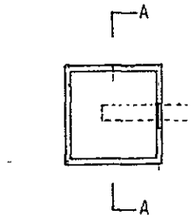
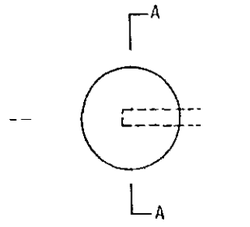


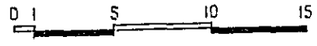
BOILER ROOM
AREA : 35 m²



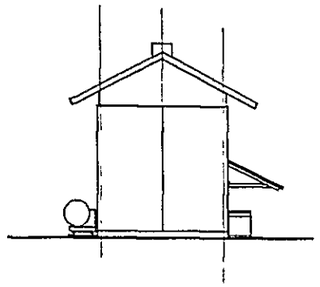
CONCRETS SILO
AREA : 20 m²



CORRUGATED STEEL SILO
AREA : 20 m²



POST-HARVEST TECHNOLOGY APPLICATION CENTER
BOILER ROOM
CONCRETS SILO
CORRUGATED STEEL SILO



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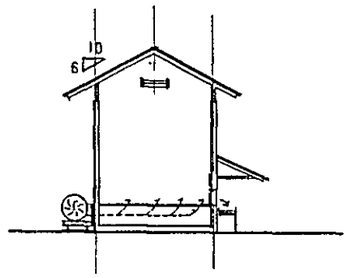

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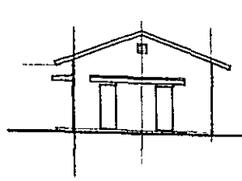

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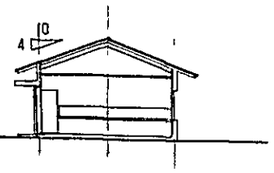
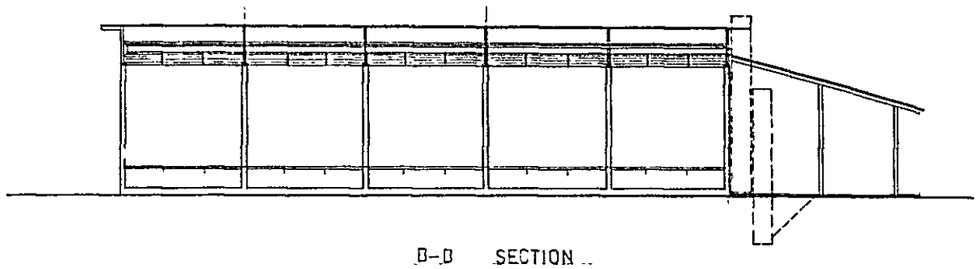


A-A SECTION



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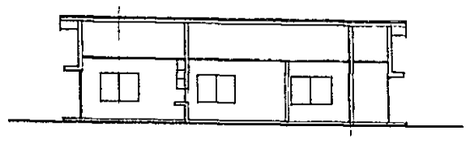

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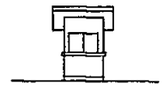

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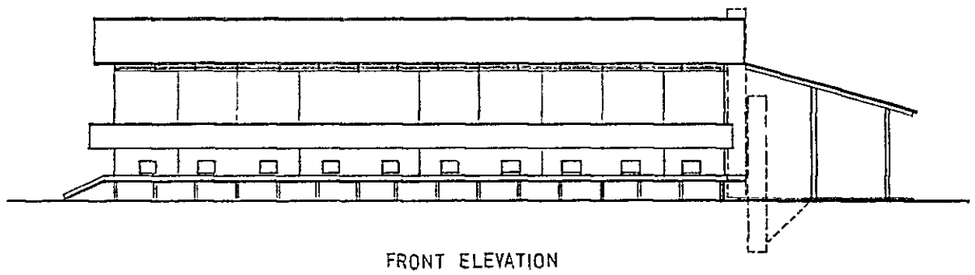

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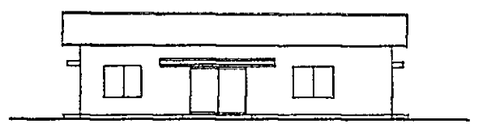

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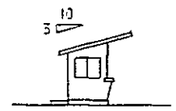
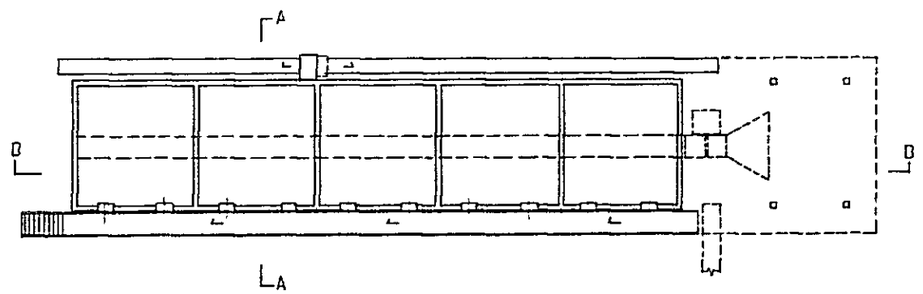
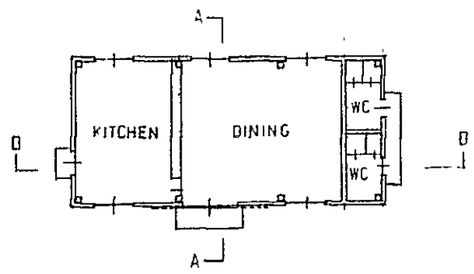


SIDE ELEVATION



PADDY STORAGE
AREA : 231 m²

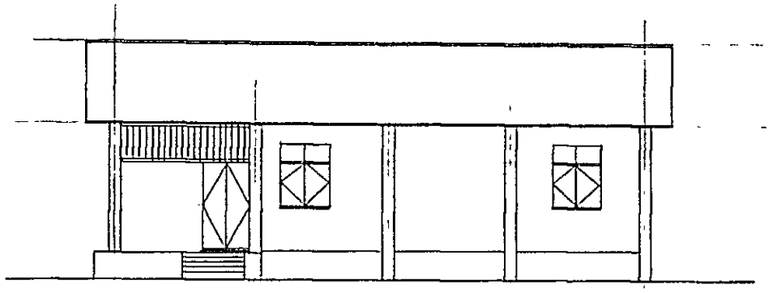


CANTEEN
AREA : 112 m²

GUARDMAN'S ROOM
AREA : 3.24 m²

0 1 5 10 15

POST-HARVEST TECHNOLOGY APPLICATION CENTRE
PADDY STORAGE.
CANTEEN.
GUARDMAN'S ROOM



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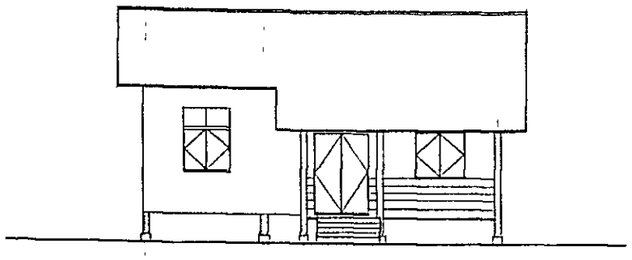

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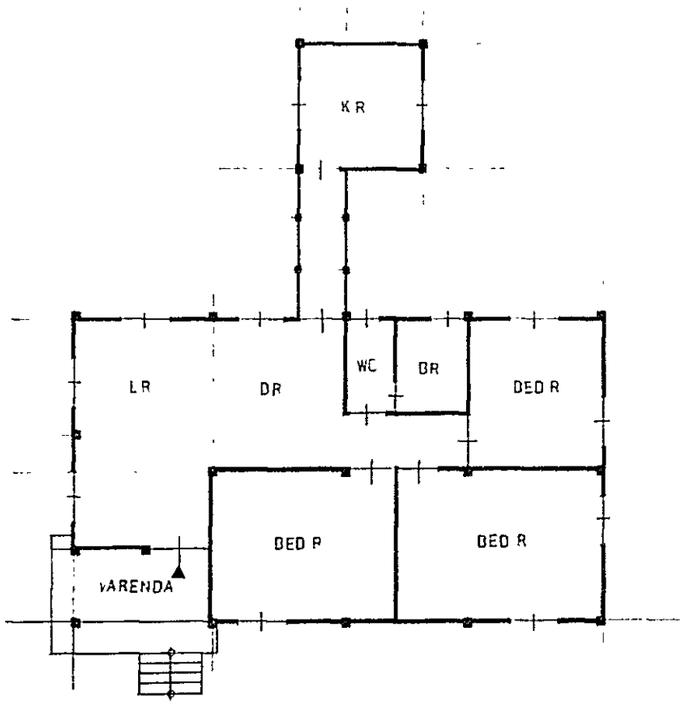
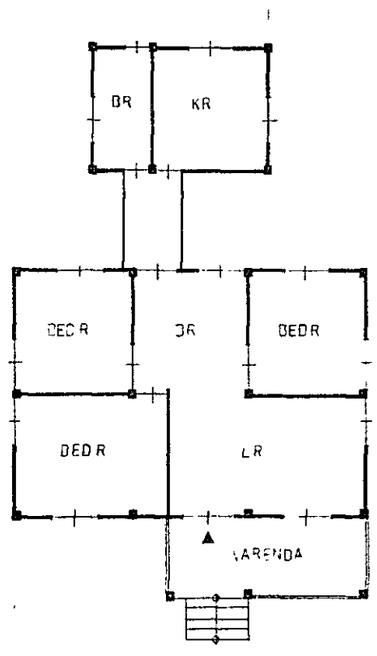


FLOOR PLAN

DIRECTOR'S RESIDENCE

AREA: 110.m^2



FLOOR PLAN

PERSONNEL QUARTER (CARETAKER)

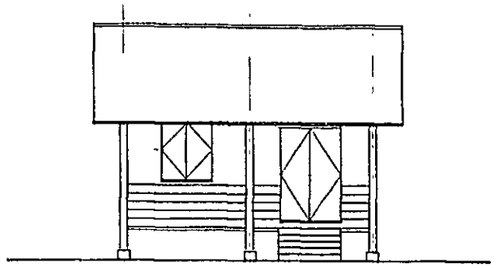
AREA: 92.m^2

POST-HARVEST TECHNOLOGY APPLICATION CENTRE

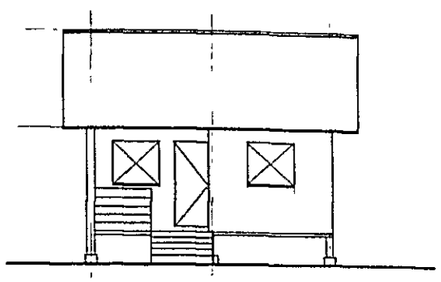
DIRECTOR'S RESIDENCE FLOOR PLAN

PERSONNEL QUARTER (CARETAKER) FLOOR PLAN

0 1 5 10



ELEVATION



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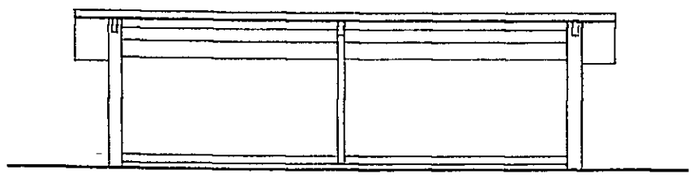

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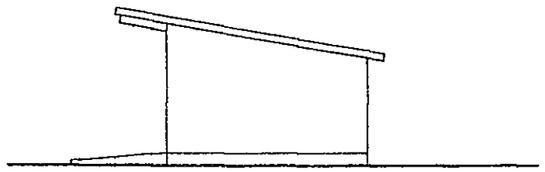

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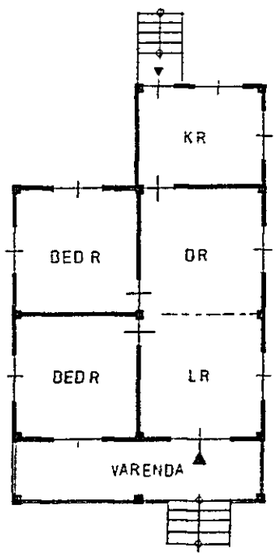
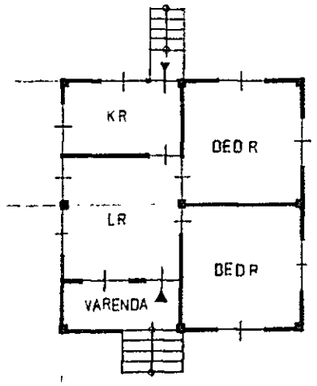
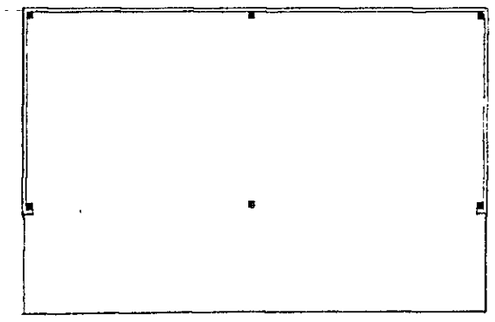


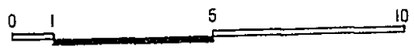
FLOOR PLAN
PERSONNEL QUARTER (JANITOR)
AREA : 54 m^2



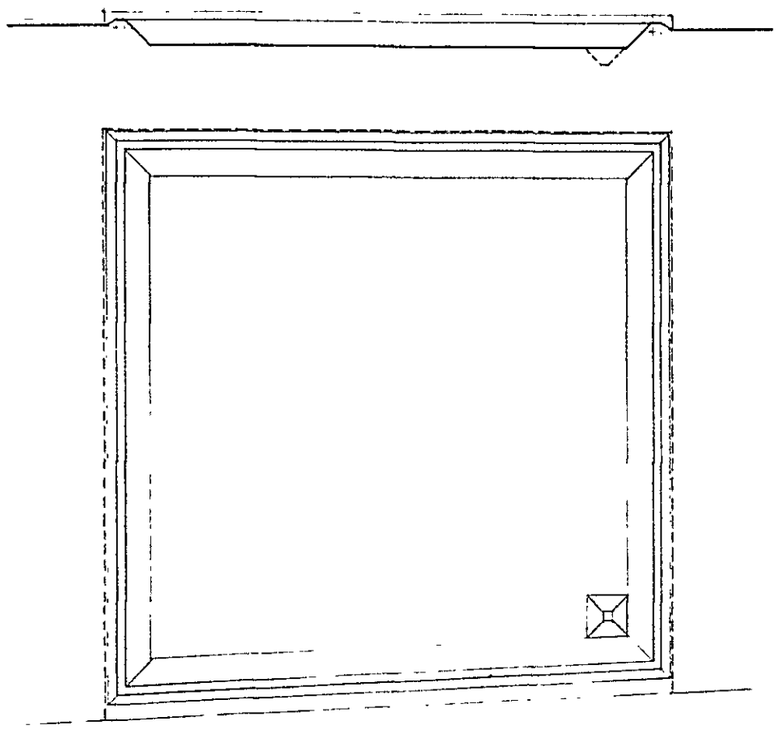
FLOOR PLAN
PERSONNEL QUARTER (DRIVER)
AREA : 37 m^2



FLOOR PLAN
GARAGE AREA : 60 m^2

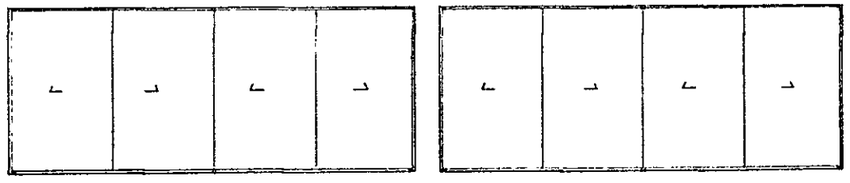


POST-HARVEST TECHNOLOGY APPLICATION CENTRE
PERSONNEL QUARTER (JANITOR) FLOOR PLAN
PERSONNEL QUARTER (DRIVER) FLOOR PLAN
GARAGE FLOOR PLAN



POND

$65^{m} \times (65+62)/2 \doteq 4120\ ^{m^3}$



DRYING YARD

$2 \times 20^{m} \times 50^{m} = 2{,}000\ ^{m^2}$

FRONT ELEVATION

GATE PLAN

FRONT ELEVATION

GATE PLAN

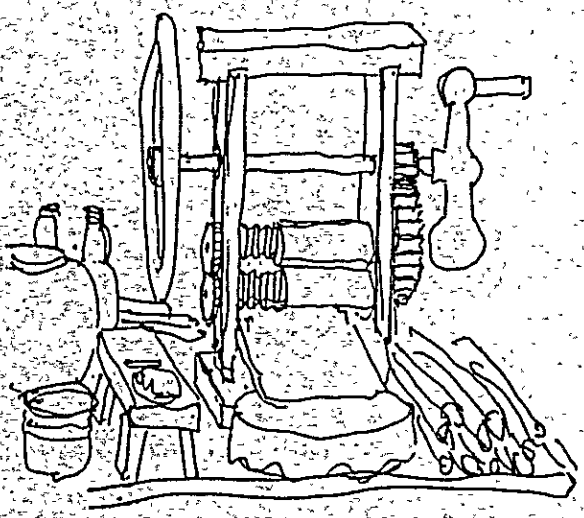
POST-HARVEST TECHNOLOGY APPLICATION CENTRE

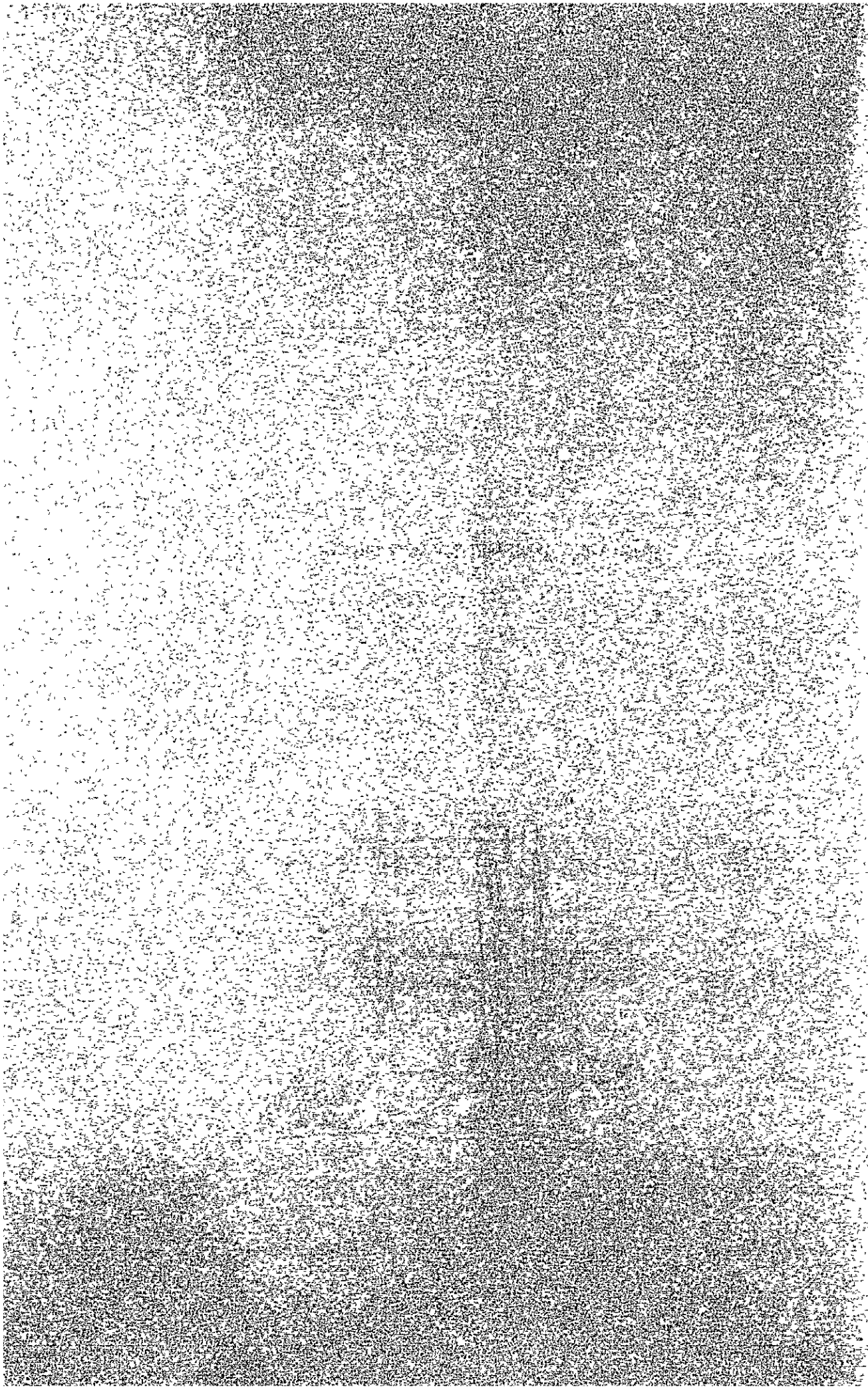
POND

DRYING YARD

GATE

Chapter 6 IMPLEMENTATION PROGRAM





Chapter 6 IMPLEMENTATION PROGRAM

6-1 Executing Agency

The Burma's executing agency for planning and implementing PTAC project is the Agriculture and Farm Produce Trade Corporation, which falls under control of the Ministry of Trade.

AFPTC has to make consultations with the New Project Appraisal Committee composed of inter-ministrial members the Economic Council and the Council of Ministers.

With respect to contract formalities on PTAC construction such as detail design, construction supervision contract, construction contract and bank procedures etc, these are executed under the responsibility of the Managing Director of AFPTC. Whereas the implementation of construction program is subject to review by the Foreign Economic Relation Department, the Central Law Office and the Equipment Control Committee, and its routine tasks are handled by a newly created body, the Centre Construction Committee, which is staffed by AFPTC officials and Construction Corporation key officials.

The Burma's authority for negotiation of foreign capital grant aid is the Foreign Economic Relation Department, which will make adjustments to formalities about the Exchange of Notes, while Myanma Foreign Trade Bank is to fainalize the financial arrangements.

6-2 Scope of Work

(1) Japan's scope of work

1) Main building and testing room buildings (parboil/drying system building, comparative testing/standard rice mill building, bran oil testing buildings), workshop, boiler room, power receiving/generator room etc., with related facilities.

2) Paddy storage testing facility (concrete-made silo and corrugated steel silo), with related buildings and facilities.

3) Intervening building construction and electrical and mechanical installation work.

4) Supply of equipment and material, as shown under description of "A" in the Minutes of Discussions.

(2) Burma's scope of work

1) Canteen, paddy warehouse, Director's residence, staff living quarters, garage, guardman room, paddy storage testing facility (wooden-made and bamboo-made).

2) Exterior field work (filling of soil and temporary bridge construction), landscaping and fencing work.

3) Outdoor building construction and electrical and mechanical installation work, along with supply of related equipment, other than those to be supplied and installed by Japan, such as water supply and sewage, drainage, electrical services and telephone network.

4) Construction of temporary access road, including temporary bridge construction.

5) Waste water purifier.

6) Supply of electricity and water for construction work.

7) Furniture, office appliances, curtains, carpets and items "C" in the Minutes of Discussions.

8) Site preparation work and removal of existing debris and obstructions.

9) Other matters as mentioned in the Exchange of Notes.

6-3 Estimate for Construction Cost

The estimated cost for implementing PTAC is summarized as below:

Exchange rate at K 1.0 = US$ 0.142 = ¥ 34. (Unit: Thousand Yen)

	Japanese portion	Burmese portion	Total
Building construction cost	980,284	922,274	1,902,558
Equipment and material cost	540,750	20,400	561,150
Engineering and supervision cost	111,609	0	111,609
Total	1,632,643	942,674	2,575,317

6-3-1 Estimate for Construction Cost (Japan's scope of work)

Unit: ¥1,000

Work item	Description		Building	AC & Ventilation	Water & sewage	Electrical services	Total
I) 1) Building	Main bldg.	1,725 m²	141,514	25,100	10,630	25610	202,854
	Testing room bldg. (parboil)	720 m²	37,763		150	12,802	50,715
	Testing room bldg. (milling)	720 m²	37,763		450	8,804	47,017
	Testing room bldg. (bran oil)	360 m²	12,610		750	5,230	18,590
	Workshop	540 m²	26,527		150	7,215	33,892
	Boiler room	35 m²	1,700	1,100	150	356	3,306
	Power generator room	105 m²	4,725			565	5,290
	Concrete silo	20 m²	5,504				5504
	Steel silo	20 m²	9,540				9,540
	Pumping room	25 m²	1,250		1,200	1,835	4,285
	Corridor	453 m²	11,065			630	11,695
	Sub-total	4,723 m²	289,961	26,200	13,480	63,047	392,688
2) Exterior field work							
	Sub-total						0
3) Major equipment	Receiving tank 40t		2,000				2,000
	Water supply				5,700		5700
	Drainage				4,000		4000
	Fire hydrants				5,500		5,500
	Electricity receiving facility					32,000	32,000
	Diesel generator 50KVA					8000	8000
	Power & telephone cable					36000	36000
	Transformer					3,000	3,000
	Water & sewage pipe				500		500
	Sub-total		2,000		15,700	79,000	96,700
Total of 1) to 3)			291,961	26,200	29,180	142,047	489388
4) Transportation (export packing included, on cif basis)							98,000
5) Overall temporary work cost							82,964
6) At-side miscellaneous expenses							209,700
7) Overhead expenses							52,600
Total of 1) to 7)							932652
II) Cost of equipment & material for research & operations							515000
Total of I) + II)							1447652
III) Consultant fee							106294
Total of I) + II) + III)							1553946
IV) Contingency							78697
Grant total							1,632643

6-3-2 Estimate for Construction Cost (Burma's scope of work)

Unit: ¥1,000

Work item	Description		Total
1) Building	Paddy storage	231 m^2	10,880
	Canteen	112 m^2	8,942
	Garage	60 m^2	850
	Guardman's room	3 m^2	340
	Staff quarters		
	1. Manager's	92 m^2	4,420
	2. Guardman's	54 m^2	2,618
	3. Driver's	37 m^2	1,802
	Director's residence	110 m^2	5,100
	Wooden warehouse	20 m^2	680
	Bamboo-made shed	20 m^2	170
	Sub-total	739 m^2	35,802
2) Exterior field work	Paddy drying yard		13600
	"		340
	Planting of tree		3,740
	In-compound road pavement	6,240 m^2	51,000
	Pond	4,120 m^2	20,400
	In-compound sewage		5,202
	Boundary fencing		680
	Sub-total		94,962
3) Facility	Exterior light		3,128
	Sewage disposal tank		7,242
	Overhead tank		7,616
	Water supply		1,870
	Electricity receiving facility		43,962
	Telephone		340
	Sub-total		64,158
4) Equipment and material for research and operations			17,000
5) Installation of equipment and facilities			3,400
	Sub-total		20,400
	Total of 1) to 5)		215,322
6) Tax			727,352
	Grand total		942,674

6-4 Problems and Counter-measures Relating to Building Construction

(1) Though the construction material and labour costs are estimated at the Burma's price indication, such pricing is never convicing. Further, since the local contractor is limited to Construction Corporation only, its price estimate appears unreasonably high. Such factors are likely to increase the construction cost to an excessively high level.

(2) The local production of construction material is in limited items only, with most of the material depending upon imports. Therefore, transportation and custom clearance etc. are likely to take a great deal of time and expenses.

(3) The local labour is generally in low technical level, needing intensive technical training in the course of construction work.

(4) The locally-produced materials such as cement, slate and aggregate etc. are to be supplied, when necessary, by the Government of Burma.

(5) The procurement of equipment and material from the third countries should be permitted, in order to reduce the cost of their maintenance.

(6) The re-export of imported temporary work materials is liable for taxation, resulting in increasing the overall construction cost.

(7) Dispatch of Japanese technicians for supervising the building construction appears rather expensive and should be reduced to the minimum possible.
Meanwhile, regarding the local labour, arrangement should be made for enabling the construction with the least possible number of labour and with the maximum possible work efficiency.

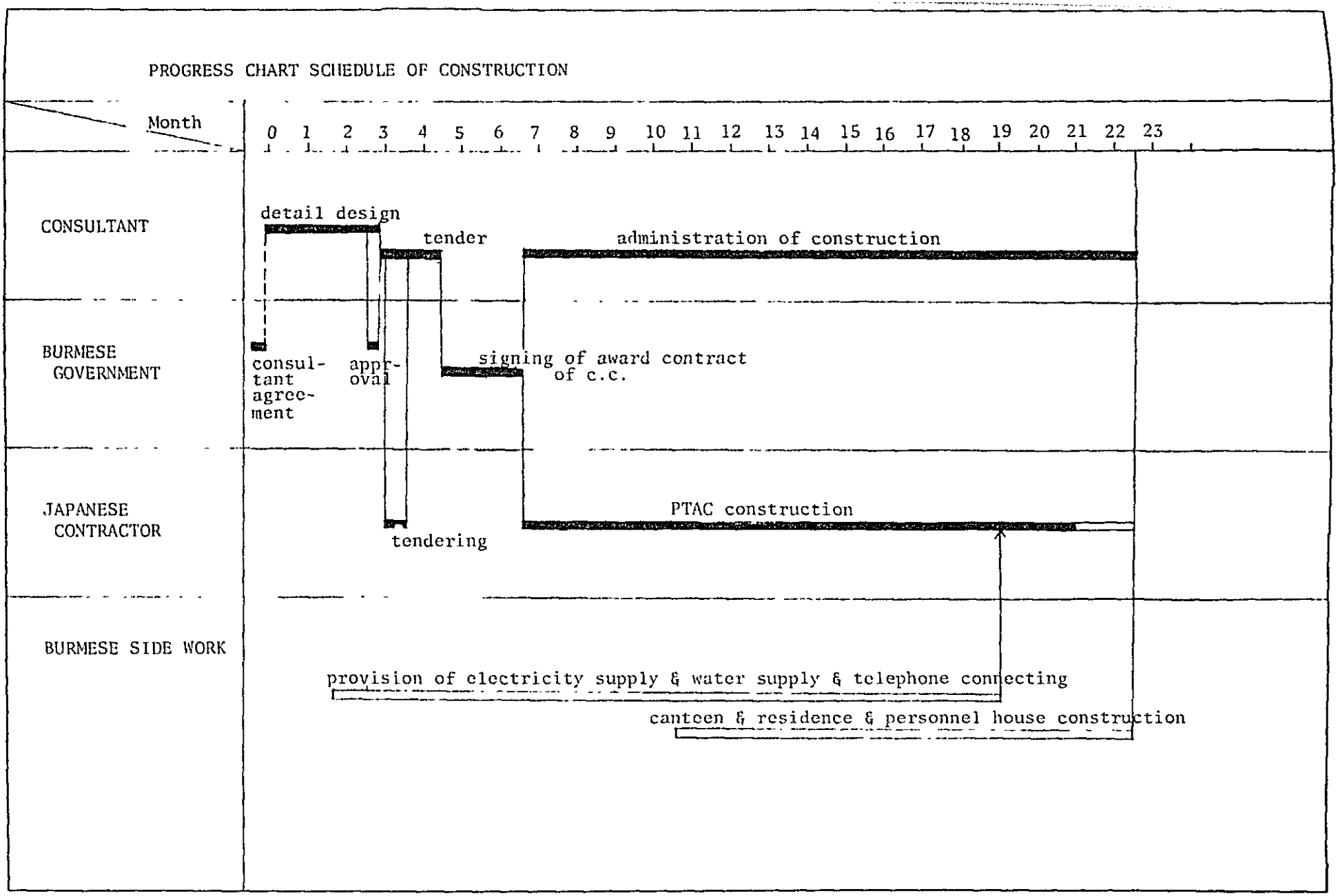
6–5 Construction Schedule

Construction schedule of PTAC is shown in the annexed chart. This schedule appears shorter by about a year than the Burma's current standard construction period. To make possible such reduction in construction period, as are described earlier, major quantities of construction material will have to be imported from Japan in pre-fabricated condition, and assembled in Burma.
Further, the most important is the timely supply of locally procured material such as cement, slate, gravel, sand, timber and glass etc.

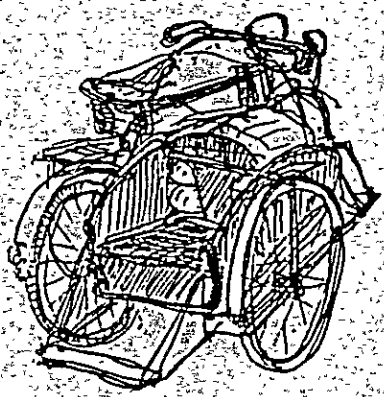
The most problematical in construction program is the rainy season in Burma for a duration of from Middle of April to Middle of October, with the monthly average rainfall of about 500 mm. This is likely to prevent the outdoor construction work such as steel structure and slate installation work. Such outdoor work is forbidden in Japan, with the average rainfall of 180 mm in Tokyo. Since in Burma, there is lack of construction equipment, immaturity of crane operating ability and difficult transport of crane and other heavy equipment along soft terrain by soil filling, it advised to suspend such outdoor construction work during the rainy season.

Therefore, it is considered as the most advisable to complete steel structure, slating work and floor finish of all the buildings before the start of rainy season, failing which steel structure and slating work should be completed by all means before the begining of the rainy season.

Accordingly, the construction program in Burma needs to be made taking into account that all phases of work to be completed during the dry season. The appended construction program has been made on such basis.


PROGRESS CHART SCHEDULE OF CONSTRUCTION
Month
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
CONSULTANT
detail design
tender
administration of construction
BURMESE GOVERNMENT
consul-tant agree-ment
appr-oval
signing of award contract of c.c.
JAPANESE CONTRACTOR
tendering
PTAC construction
BURMESE SIDE WORK
provision of electricity supply & water supply & telephone connecting
canteen & residence & personnel house construction

Chapter 7 OPERATION AND MAINTENANCE PROGRAM



Chapter 7 OPERATION AND MAINTENANCE PROGRAM

7–1 Maintenance of Equipment and Building Facility

Maintenance of equipment and building etc. is administered by Administration and Maintenance Department.

Regarding equipment and material under charge of individual research departments, their maintenance is to be carried out by Administration department in cooperation with individual research departments, in such way:

Regarding maintenance of equipment and instruments, the Administration Department is to prepare the inventory list of major equipment, keep in assortment a variety of specifications, instruction manuals, part list and maintenance manuals, and distribute copies of such lteratures to respective departments.

Further, records of part exchange, procurement, repair, modification etc. should be discribed on a uniform format.

Regarding consumables, supplies and chemicals for experimental use etc., store-keeping should be done under charge of Administration department, while detailed bookkeeping is to be done by respective research departments.

Along with gradual expansion of respective research department, facilities and material will get fully utilized, resulting in proportionate wear and tear. Forecast for necessary replenishment and repair must be reported to Administration Department, and then coordinated by the Planning, Promotion and Budget Department, for inclusion into the operation budget. Regarding the fixed assets, the depreciation need to be included into the budget and deposited as required.

7–2 Operation Budget

As the salary and wages for PTAC staff and labour are to be disbursed out of AFPTC's separate budget, these are excluded from the operating capital of PTAC.

Though the necessary operating budget will need to be deliberately determined at a later date, the outline of operational needs are estimated for the time being as below:

Operating budget	1.5 mil. K.

(break-down)

1.	Research activity expenses (literature collection, publication and publicity, training and enlightenment, research and conferences, equipment, repair and spare parts etc.)	
	1) Literature collection (books, magazines, films, dictionaries, etc.)	50,000 K.
	2) Publication and publicity (monthly and annual report)	100,000 K.
	3) Training and enlightenment (pamphlet, training, publicity)	150,000 K.
	4) Survey and conference	50,000 K.
	5) Equipment repair and spare parts	150,000 K.
	6) Chemicals and consumables for experiments	50,000 K.
	7) Paddy purchase, steel and engineering material	100,000 K.
	Sub-total	650,000 K.
2.	Office stationary	20,000 K.
3.	Light and water charge (electricity charge, telephone charge, fuel expense)	200,000 K.
4.	Building and facility maintenance	300,000 K.
5.	Insurance premium	
	1) Fire insurance (80% of appraisal value)	280,000 K.
6.	Tax and levy, Interest	50,000 K.

The above-stated budgetary estimates are likely to increase as years pass in respect of building and equipment maintenance cost. According to the magnitude of research activity, the operation expenses can be varied.

Estimate for electricity consumption

1) Conditions in calculation

(1) Installed capacity of respective buildings is worked out and multiplied by demand factor (D.F.), according to purpose.

2) Electricity consumption of building

	Power			Lighting		
	Installed capacity	D.F.	Consumption	Installed capacity	D.F.	Consumption
1. Main building	80 KW	0.8	64 KWH	66 KW	0.7	46 KWH
2. Testing rooms (rice milling)	120	0.4	48	15	0.7	11
3. " (parboil/drying)	50	0.6	30	15	0.7	11
4. " (bran oil)	50	0.7	35	8	0.7	6
5. Workshop	50	0.4	20	12	0.7	9
6. Power receiving/generator				2	0.5	1
7. Canteen				10	0.4	4
8. Boiler room	5	0.8	4	2	0.5	1
9. Staff quarters				6	0.7	4
10. Director's residence				4	0.7	3
11. Pumping room	20	0.3	6	1	1.0	1
12. Exterior lights				5	0.2	1
13. Paddy storage	10	0.5	5			
Total	385		212	146		98

3) Monthly electricity consumption

Power: 212 KW x 8 hr/day x 25 days = 42,400

Light: 98 KW x 8 hr/day x 25 days = 19,600

Total 62,000 KWH/month

4) Monthly electricity charge

EPC charge	1 - 500 KWH	¥17.8/KWH
	501 - 5,000 KWH	¥14.5/KWH
	5,000 -	¥11.2/KWH

500 KWH x ¥17.8/KWH + 4,500 KWH x ¥14.5/KWH + 57,000 KWH x ¥11.2/KWH = 8,900 + 65,250 + 638,400 ≒ ¥712,000/month

Chapter 8 EVALUATION OF PROJECT