

TABLE 5.5 AREA OF TANKS AND PENS

Types of tanks & pens	Size of one block & number (m x m x number)	Total area (m ²)
Tank for 1-year-old crocodiles	1.8 x 2.3 x 72	298.1
Tank for 2-year-old crocodiles	3.8 x 7.3 x 24	665.8
Isolation tank	3.8x3.8x 8+1.8x1.8x32	219.2
Experimental tank	3.8x19.8x 1+1.8x19.8x 1	110.9
Pen for 3-6 year-old crocodiles	332 x 2 + 318 x 2 + 279 x 1	1579.0
Pen for 7-9 year-old crocodiles	491 x 2 + 431.7 x 1 + 550.3 x 1	1968.0
Breeding pen	39.8 x 49.8 x 3	5946.1
	19.8 x 24.8 x 2	982.1
Breeding pen for experimental purpose	39.8 x 39.8 x 1 + 29.8 x 39.8 x 1	2770.1
Disinfection pen	5.8 x 11.8 x 2 + 19.9 x 11.8 x 2	417.7
T O T A L		14,956.9

(4) Building Facilities Planning

① Air conditioning and ventilation system

For air conditioning, a local cooling system will be applied. That is, a water-cooled package type air conditioner for exclusive cooling use will be installed in each room that will require cooling. A ceiling concealed type cooler will be selected according to the cooling load of the rooms to be cooled. A wall type louver will be installed in the room to be cooled for fresh air intake.

For ventilation, a local ventilation system will be applied in principle. Fans will be installed in laboratories, the incubator room, Machine House, toilets and shower rooms. Air intake fans and exhaust fans will be installed in the kitchen and wet lab.

Filters will be provided on the air intake side. The hatching special care room will be naturally ventilated by windows and the monitor roof, and direct sun rays will be reduced by a canvas curtain on the ceiling level, in order to prevent temperature rise in the day time. For temperature drops at night, heat radiation will be controlled by closing the windows and the canvas curtain.

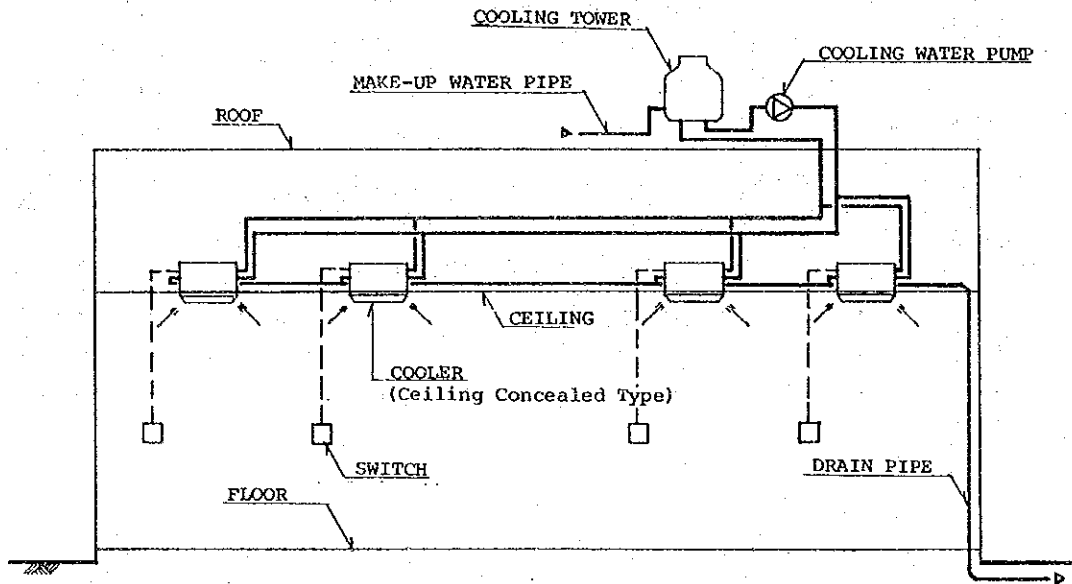


FIG. 5.3 DIAGRAM OF COOLING SYSTEM

Rooms to be cooled

Director's office
 Asst. director's office
 Japanese team leader's office
 Secretary's office
 Manager's office

Administration and
 Training Building

Japanese experts' office
 Conference room cum
 Library

Laboratory Building

② Plumbing system.

a. Water supply system

A deep well will be used as water source. Water will be lifted up by a submerged pump and stored in the storage tank through a sand separator.

Potable water piping system:

A quality test of the well water has found that the water contains an excessive concentration of iron, higher than the Philippine standard for potable water. An iron extractor will be installed to conform to the standard.

After chloride is poured into the water for sterilization, this water will be stored in the reservoir tank. Water will be lifted from the potable water reservoir tank to the elevated tank, then distributed to each discharge point by a gravity type supply system.

Crocodile farming water piping system:

Water for crocodile farming use will be supplied directly from the storage tank because it need not be of potable quality. Because of low water temperature, the water will be kept in a pond to be warmed by solar heat until it is supplied to each pen. However, as the quality test of well water has found a high concentration of iron, chloride will be mixed on the way from the storage tank to the pond to exclude iron content, then water will be left for about 20 hours to extract and sediment iron content by aeration and sunshine. The plan is for water to be supplied by a pressure-pump system because relatively high pressure is required for the cleaning of the rearing and breeding pens, and for the long pipe line.

A diagram of the water supply system is shown on the following page.

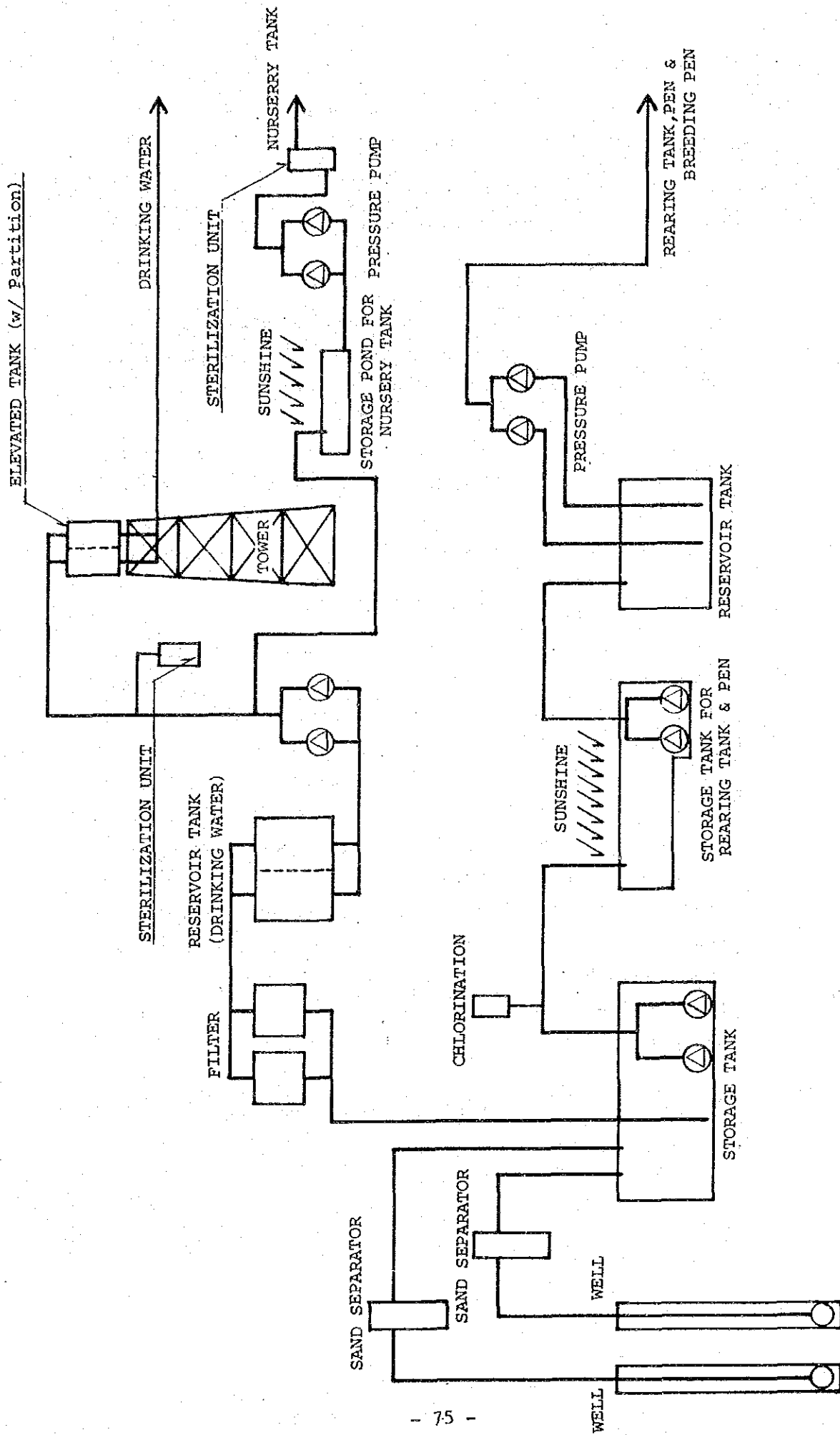


FIG. 5.4 DIAGRAM OF WATER SUPPLY SYSTEM

b. Drainage system

Sanitary water and sewage water:

Sanitary water and sewage water will be drained into separate systems within the buildings, and then combined at the first pit outside the buildings and treated in a sewage treatment system.

Laboratory waste water:

Waste water out of the Laboratory Bldg. containing a great amount of acids and alkalis will be drained into a special system, treated in a neutralization tank and piped to the sewage treatment system.

Waste water from rearing and breeding pens:

Water in bottom part of pens and drained water at the time of cleaning will be led into the sewage treatment system. Some of surface water will be re-utilized for the feed culture ponds through the reutilization water tank, and other water will be discharged into the Irawan River.

Rain water:

Rain water on each building and on the ground will be discharged into the Irawan River through the rain water drainage ditch.

Treated water:

The sewage treatment system will be of the combination treatment system. Treated water will be discharged into one of the feed culture ponds.

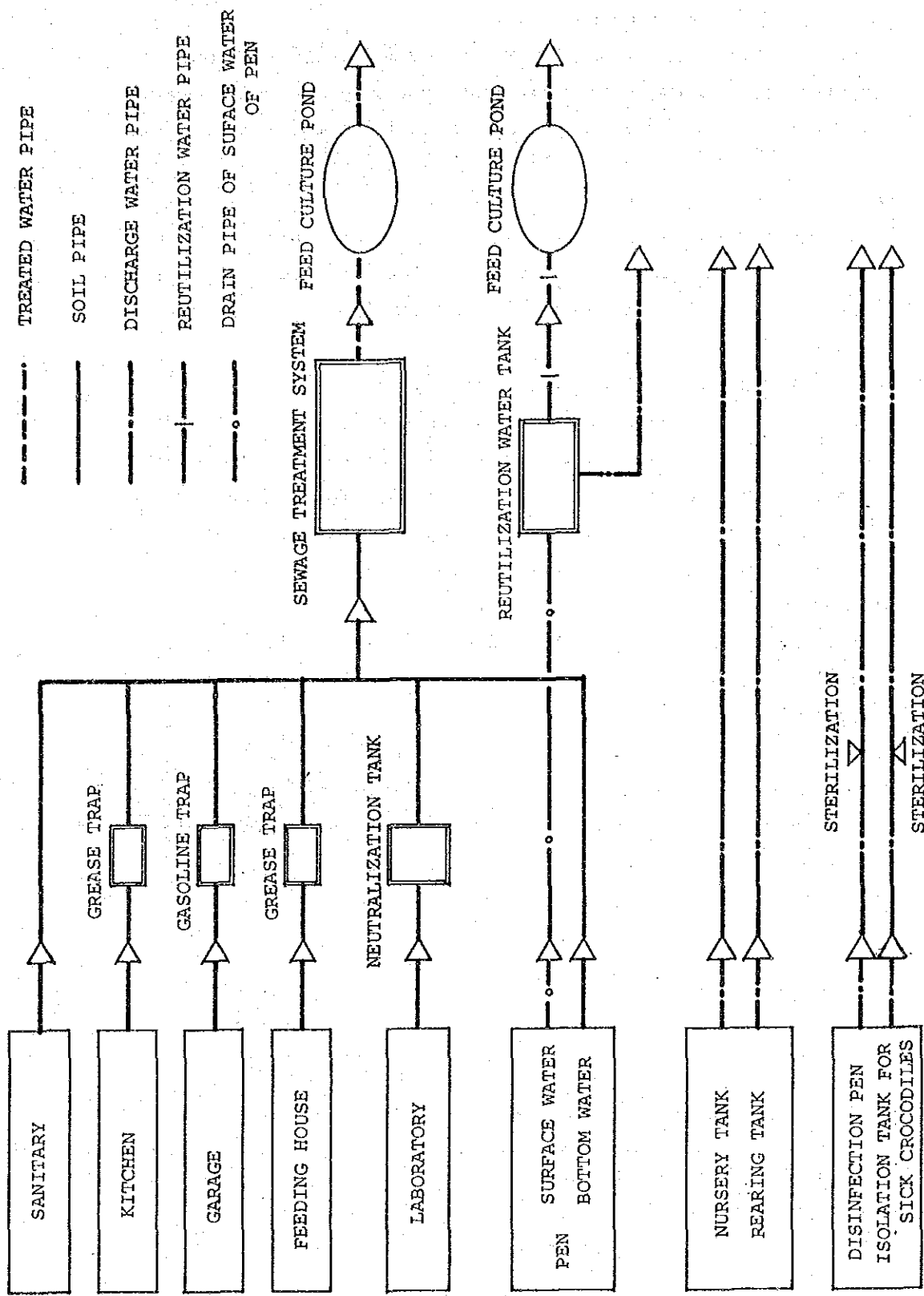


FIG. 5.5 DIAGRAM OF DRAINAGE SYSTEM

c. Hot water supply system

A solar heater will be used as heat source for the hot water supply system. A gas boiler will be provided as an auxiliary heat source. Solar collectors will be installed on the roof of each building where a hot water supply system is to be provided, and arranged to collect sunshine efficiently. Heated water will be piped into the heat storage tank. Cold water will be heated as it runs through the heat storage tank coil. This hot water will be used in the kitchen, shower rooms, Japanese Experts' House, Dormitory and for washing laboratory equipment.

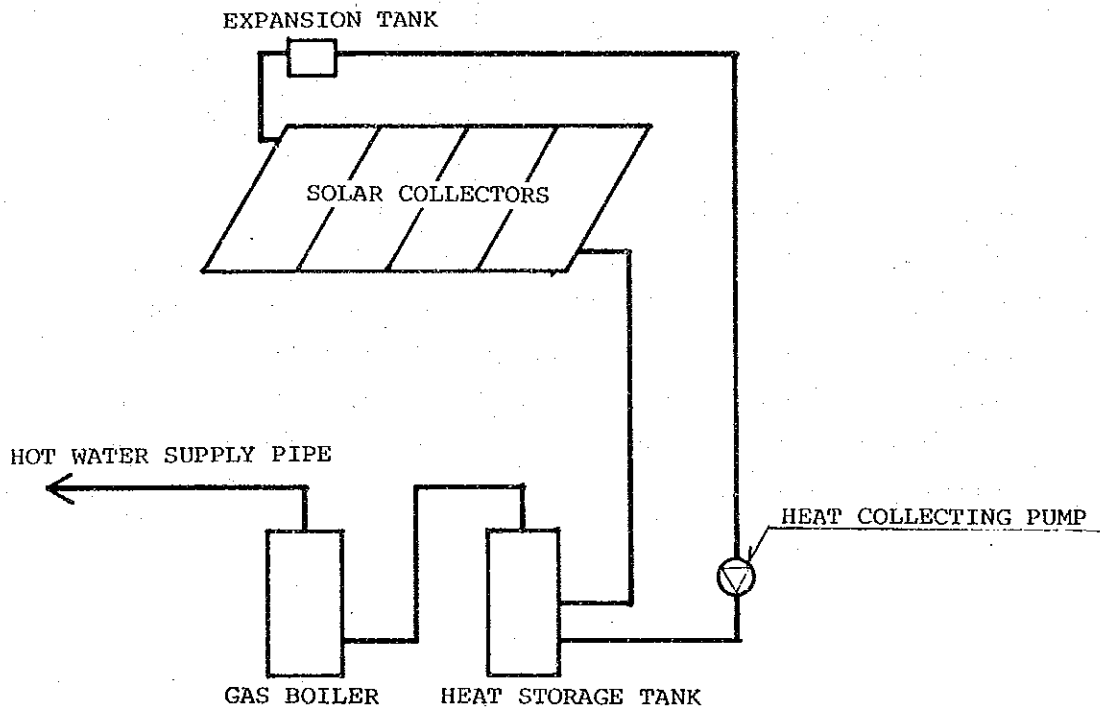


FIG. 5.6 DIAGRAM OF HOT WATER SUPPLY SYSTEM

d. Gas supply system

Liquified petroleum gas (LPG) will be used. A central distribution unit of 50 kg-capacity cylinders will be provided for Administration and Training Bldg., Japanese Experts' House and Dormitory to distribute LPG to the required places.

Gas cylinders will be separated into two systems with an automatic change-over valve.

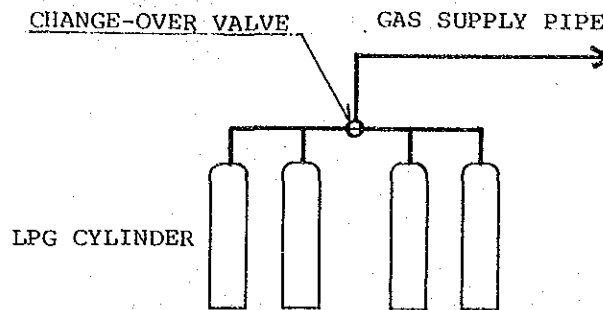


FIG. 5.7 DIAGRAM OF GAS SUPPLY SYSTEM

e. Fire extinguishing system

Interior fire hydrants will be installed in Administration and Training Bldg., Laboratory Bldg., Maintenance Bldg., and Hatchling House - A. Each fire hydrant box will be provided with a valve, hose, nozzle, etc. Piping will be connected to each hydrant box from the same water source as the water supply system.

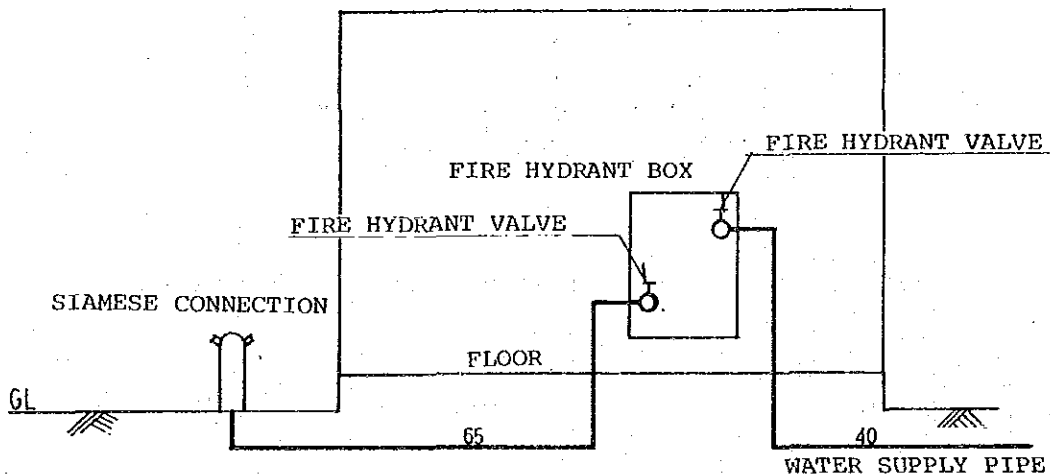


FIG. 5.8 DIAGRAM OF FIRE EXTINGUISHING SYSTEM

f. Kitchen equipment

Kitchen equipment will be installed in the kitchen of Administration and Training Building. They will have a capacity to prepare 60 meals at a time.

g. Incinerator

An incinerator will be installed outside to burn paper, rubbish, laboratory wastes, etc. It will be provided with a standby burner unit.

③ Electric system

a. Electric power supply system

Electric power of 3 ϕ 220 V, 60 Hz will be supplied from a high tension power line of 3 ϕ 13,200 V, 60 Hz running along the national road as part of the PALECO system on the west side of the Site, to the primary side of the main switch through the pole transformer in the Site.

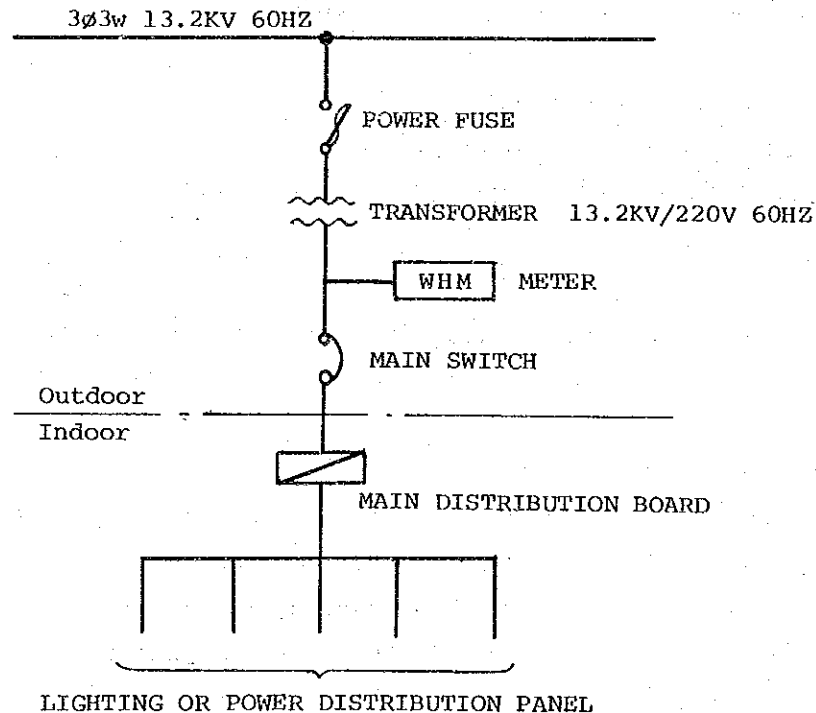


FIG. 5.9 ELECTRIC POWER SUPPLY

b. Main feeder equipment

From the primary side of the main switch, electric power will be distributed to the lighting control panel and the power control panel through the distribution board.

c. Power supply equipment

Power supply equipment will supply and control power to the air cooling equipment, laboratory and research equipment, water supply and drainage pumps, etc. A power control panel and a distribution board will be installed in each zone to supply electric power.

d. Lighting fixture

Fluorescent lamps will be used in principle. Lighting fixtures will be selected to ensure sufficient illumination.

e. Receptacle outlet system

Receptacle outlets of 1 ϕ 220 V and/or 1 ϕ 100 V will be provided at necessary places in each room.

f. Telecommunication system

An interphone system will be provided for inter-communication between rooms and buildings.

g. Fire alarm system

Smoke detectors and thermal detectors will be installed in major rooms for the detection of fires.

h. Standby generator system

A generator system with minimal required capacity will be provided for power failure. This minimal required capacity is for the interphone system, fire alarm system, incubators, feed freezer and refrigerator, a part of laboratory equipment, and a part of the lighting system.

i. Security system

An electric field type security check system will be provided to search out strangers intruding through the long boundary fence of the Site. This system will be central-controlled at the guard room.

(5) Equipment Plan

The functions of the Institute are to carry on research of resources, ecology and farming technology, studies of farming, breeding and dissemination and instruction in crocodile farming techniques. Equipment and facilities which are necessary for research are classified according to uses as shown below:

1) Physical and chemical lab. equipment

These equipment are for research, examination and analysis in the laboratories.

2) Optical equipment and electrical appliances

These equipment are mainly for study, observation and training in the laboratories and training room.

3) Laboratory furniture and instruments

4) Crocodile farming equipment and apparatus

5) Other equipment

1 PHYSICAL AND CHEMICAL LAB. EQUIPMENT

EQUIPMENT NAME	APPLICATION	Q'ty
1- 1 Automatic high speed refrigerated centrifuge	For biochemical studies, separation of blood corpuscles and cells	1
1- 2 Centrifuge	For biochemical studies	2
1- 3 Cellulose acetate electrophoresis	Analysis of molecular properties of protein and enzyme, etc.	2
1- 4 Spectrophotometer	General quantitative analysis in samples	2
1- 5 Column chromatography	Separation/Analysis of protein and enzyme, etc.	1
1- 6 Thin layer chromatography	same as above	2
1- 7 Atomic absorption spectrophotometer	Trace analysis of metallic elements	1
1- 8 Sugar polarimeter	Analysis of sugar, volatile oil, alkaloids, etc.	1
1- 9 Kjeldahl digesting apparatus	Quantitative analysis of N	1
1-10 Fats extraction apparatus	Extraction of fats	1
1-11 Ultrasonic cell disintegrator	Disintegration of cells and samples for analysis	1
1-12 Auto still	Production of distilled water for experiments	2
1-13 Drying oven	Drying of glassware and equipment	2
1-14 Incubator	Cultivation of bacilli and microorganisms	2
1-15 Electric furnace, Muffle's	Quantitative determination of ash, metals and other materials	1
1-16 Infrared moisture meter	Determination of water contents in samples	1

1-17 Drying sterilizer	Sterilization of glassware, equipment and apparatus	2
1-18 Autoclave	Sterilization of culture mediums and equipment	1
1-19 Constant temperature water bath	Chemical tests in constant temperature	2
1-20 Water bath incubator	Shaking samples, chemical tests and cultivation of microorganisms in constant temperature	2
1-21 Magnetic stirrer	To stir and dissolve samples	L2 S2
1-22 Test tube mixer	To stir and mix samples in test tubes, centrifugal tubes and others	4
1-23 Hot plate	Heat treatment of samples	2
1-24 Paraffin spreading apparatus	To spread pieces of paraffin specimen by microtome	1
1-25 Rotary microtome	Continuous cut of paraffin specimen	1
1-26 Calorimeter	Determination of calorie value of samples	1
1-27 Water chilling unit	Production of large volume of chilled water	1
1-28 Hematocrit centrifuge	Separation of blood tissue	1
1-29 Blood analyze unit	Analysis of blood	1
1-30 Serum protein refractometer	Determination of protein concentration in serums and blood plasma	1
1-31A Analytical balance		2
B Electric top pan balance		2
C Top pan balance		L2 S2
1-32 Filtering apparatus	To filter off dirt of water (color, odor, etc.)	2

1-33	Portable radiography	Observation and photographing of samples by super soft x-ray	1
1-34	Aseptic box	Pathological examination in germ-free condition	1
1-35	Aseptic room	same as above	1
1-36A	Ultrasonic cleaner	Washing of glassware, chips and others	2
	B For pipette		1
1-37	Automatic washer	Washing of glassware and other equipment	1
1-38A	Electro thermometer	For general experiment and observations	3
	B Soil thermometer		3
1-39	Temperature/Humidity auto-recorder		3
1-40	Soil moisture tester	Measurement of soil moisture of egg-laying ground	3
1-41	Lux meter	Measurement of luminous intensity	2
1-42	PH meter	General chemical experiments and water quality check	3
1-43	Conductivity meter	same as above	1
1-44	Water quality checker	Determination of basic water quality parameters	4
1-45	Portable cooler	Cooling water for experiments	2
1-46	Blood cell counter		2
1-47	Glass and plasticware and apparatus		1 set
1-48	Chemicals		1 set

2 OPTICAL EQUIPMENT & ELECTRICAL APPLIANCES

EQUIPMENT NAME	APPLICATION	Q'ty
2- 1 Stereoscopic microscope	General observation of parasites and microstructure	3
2- 2 Biological microscope	Observation of tissue specimens, germs, etc.	2
2- 3 Photographic apparatus for microscope		2
2- 4 Binoculars	For outdoor observation	4
2- 5 Still camera	For general photographing	2
2- 6 Slide projector	For research report meeting and training lecture	2
2- 7 Overhead projector	same as above	1
2- 8 Video camera set	For observation and research report meeting and so on	1
2- 9 Dark room instrument	Development processing of common black/white films	1 set
2-10 Copying machine	Copy of tracing paper for overhead projector and body pattern of crocodiles, etc.	2
2-11 Recorder set	Recording of crocodile voices and so on	1 set
2-12 Screen	For projector	2
2-13 Radio telephone and transceiver set	Communication in outdoor observation between Institute and cars, etc.	1 set
2-14 Microcomputer	Data recording, processing and analysis	1 set
2-15 Typewriter		2

3 LABORATORY FURNITURE & INSTRUMENTS

EQUIPMENT NAME	APPLICATION	Q'ty
3- 1 Balance table	For analytical balances	2
3- 2 Wagon and carrier	Used as side-table and/or transportation of equipment	1 set
3- 3 Refrigerator	Storage of chemicals and samples	5
3- 4 Deep freezer	Freezing and storage of samples and so on	4
3- 5 Ice maker	Transportation of samples and chemical experiments at low temperature	1
3- 6 Dissecting and surgery set	Anatomical examination and medical treatment	2 sets
3- 7 Water tank (FRP)	Research and observation of crocodiles	S 4 M 2 L 2
3- 8 Balance	Weighing of crocodiles	S 1 M 1
3- 9 Drafting instrument	To draft devices and instruments for farming and experiment	1 set
3-10 Vacuum pump	For general experiments	3
3-11 Animal gauge (slide calipers)	Measurement of length and width of crocodiles	1
(outside calipers)		1

4 CROCODILE FARMING EQUIPMENT & APPARATUS

EQUIPMENT	APPLICATION	Q'ty
4 - 1 Feed preparation apparatus set	Processing of feed	1 set
4 - 2 Cold storage facilities	Freezing and stocking fish for feed	1 set
4 - 3 Nursery tank (A)	Nursery of crocodiles up to 2 weeks after hatching	170
Nursery tank (B)	For crocodiles from 2 weeks to 1 year after hatching	200
4 - 4 Incubator	For artificial hatching of crocodiles	10
4 - 5 Containers and buckets	Preparation, transportation and stock of feed and others	1 set
4 - 6 Weighing spring balance	Weighing of feed, baby crocodiles and so on	S 2 L 2

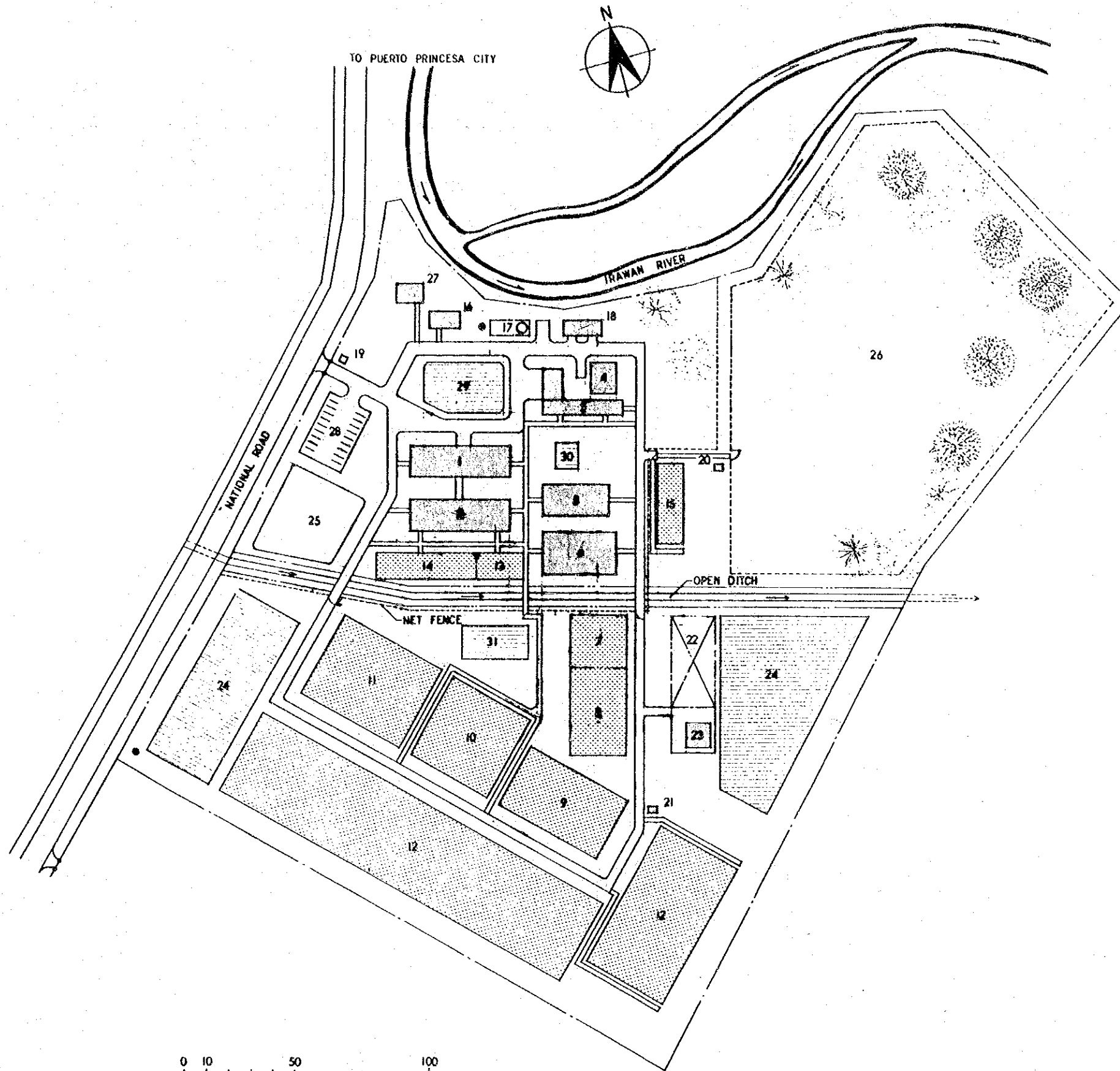
5 OTHER EQUIPMENT

EQUIPMENT NAME	APPLICATION	Q'ty
5- 1 Water pump	Discharge of waste water from tanks, ponds, etc.	3
5- 2 High pressure washer	Washing of ponds and tanks	2
5- 3 Portable generator	Outdoor observation, work, etc.	S 2 M 1
5- 4 Sprayer	Disinfection of pens, etc.	S 2 L 1
5- 5 Bush cutter		2
5- 6 Heavy duty automobile	Outdoor observation and dissemination	2
5- 7 Small size truck	Transportation of crocodiles, goods, and so on	1
5- 8 Refrigerator truck	Transportation of feed fish	1
5- 9 Wheel loader	Multipurpose	1
5-10 Boat	For observation	1
5-11 Tool set	Maintenance, repairing and processing of cars, equipment and instruments	1 set

CHAPTER 6 . BASIC DRAWINGS

CHAPTER 6 BASIC DRAWINGS

- 01 SITE PLAN
- 02 ADMINISTRATION AND TRAINING BUILDING
- 03 LABORATORY BUILDING
- 04 MAINTENANCE BUILDING AND GARAGE
- 05 HATCHLING HOUSE - A
- 06 HATCHLING HOUSE - B
- 07 FEED HOUSE, MACHINE HOUSE
- 08 JAPANESE EXPERTS' HOUSE,
DORMITORY FOR PROMOTERS UNDER TRAINING
- 09 INCINERATOR HOUSE, OBSERVATION HOUSE, GATE HOUSE
- 10 REARING TANK - I, II
- 11 EXPERIMENTAL REARING PEN
- 12 REARING PEN - I, II
- 13 BREEDING PEN
- 14 BREEDING PEN
- 15 EXPERIMENTAL REARING TANK,
TANKS FOR SICK AND INJURED CROCODILES (ISOLATION TANKS)
- 16 PENS FOR NEWLY ARRIVED CROCODILES
(DISINFECTION PENS)
- 17 WATER SUPPLY SYSTEM
- 18 DRAINAGE SYSTEM
- 19 ELECTRIC SYSTEM

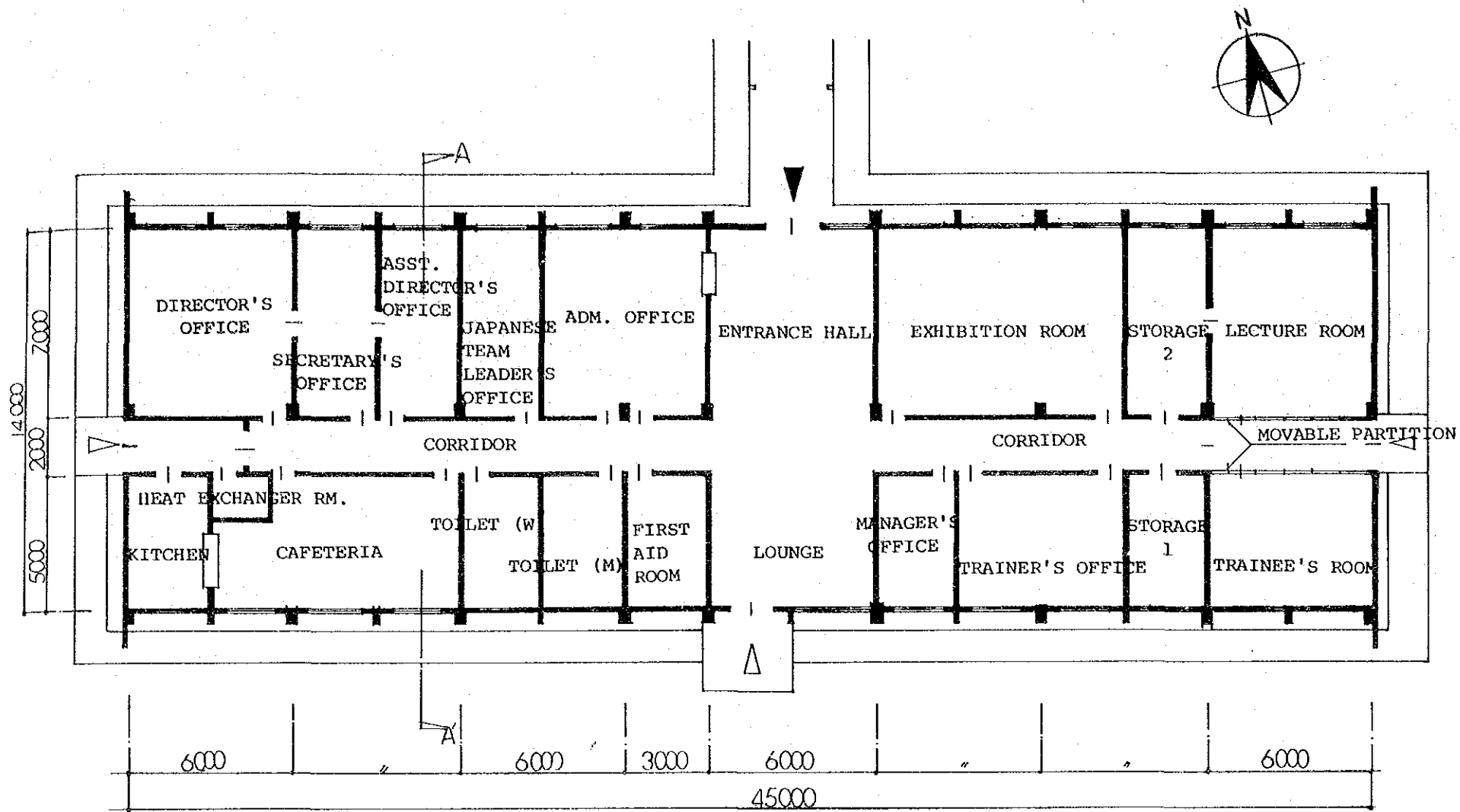


INSTRUCTIONS

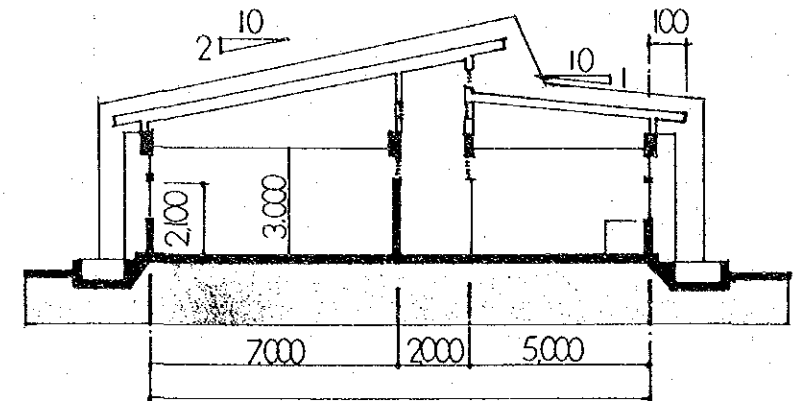
1. ADMINISTRATION AND TRAINING BUILDING
2. LABORATORY BUILDING
3. MAINTENANCE BUILDING AND GARAGE
4. FEED HOUSE
5. HATCHLING HOUSE - A
6. HATCHLING HOUSE - B
7. REARING TANK - I (for 60 - 105 cm crocodiles)
8. REARING TANK - II (for 105 - 150 cm crocodiles)
9. EXPERIMENTAL REARING PEN
10. REARING PEN - I (for 3 - 6 year crocodiles)
11. REARING PEN - II (for 7 - 9 year crocodiles)
12. BREEDING PEN
13. EXPERIMENTAL REARING TANK
14. TANKS FOR SICK AND INJURED CROCODILES (ISOLATION TANKS)
15. PENS FOR NEWLY ARRIVED CROCODILES (DISINFECTION PENS)
16. JAPANESE EXPERTS' HOUSE
17. RESERVOIR TANK AND ELEVATED TANK
18. MACHINE HOUSE
19. GATE HOUSE
20. OBSERVATION HOUSE - I
21. OBSERVATION HOUSE - II
22. SEWAGE TREATMENT SYSTEM
23. INCINERATOR HOUSE
24. FEED BREEDING POND
25. SPACE FOR DEMONSTRATION PEN (FUTURE CONSTRUCTION)
26. NATURAL OBSERVATION PEN
27. DORMITORY FOR PROMOTERS UNDER TRAINING
28. PARKING LOT
29. STORAGE POND FOR REARING TANK & PEN
30. STORAGE POND FOR NURSERY TANK
31. STORAGE POND OF REUTILIZATION WATER

0 10 50 100

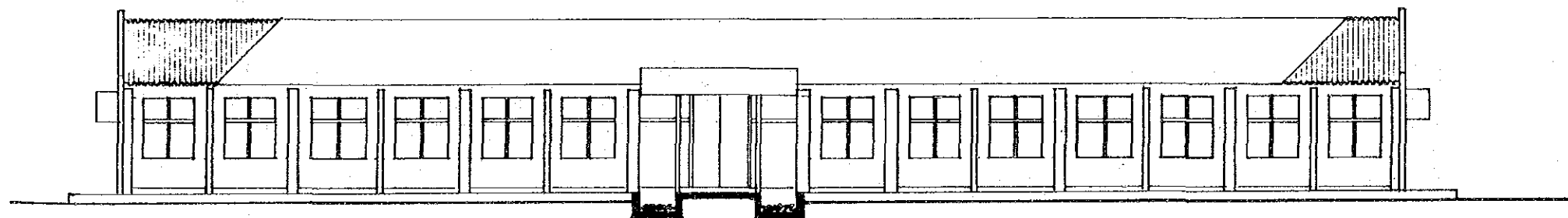
SCALE 1/2000



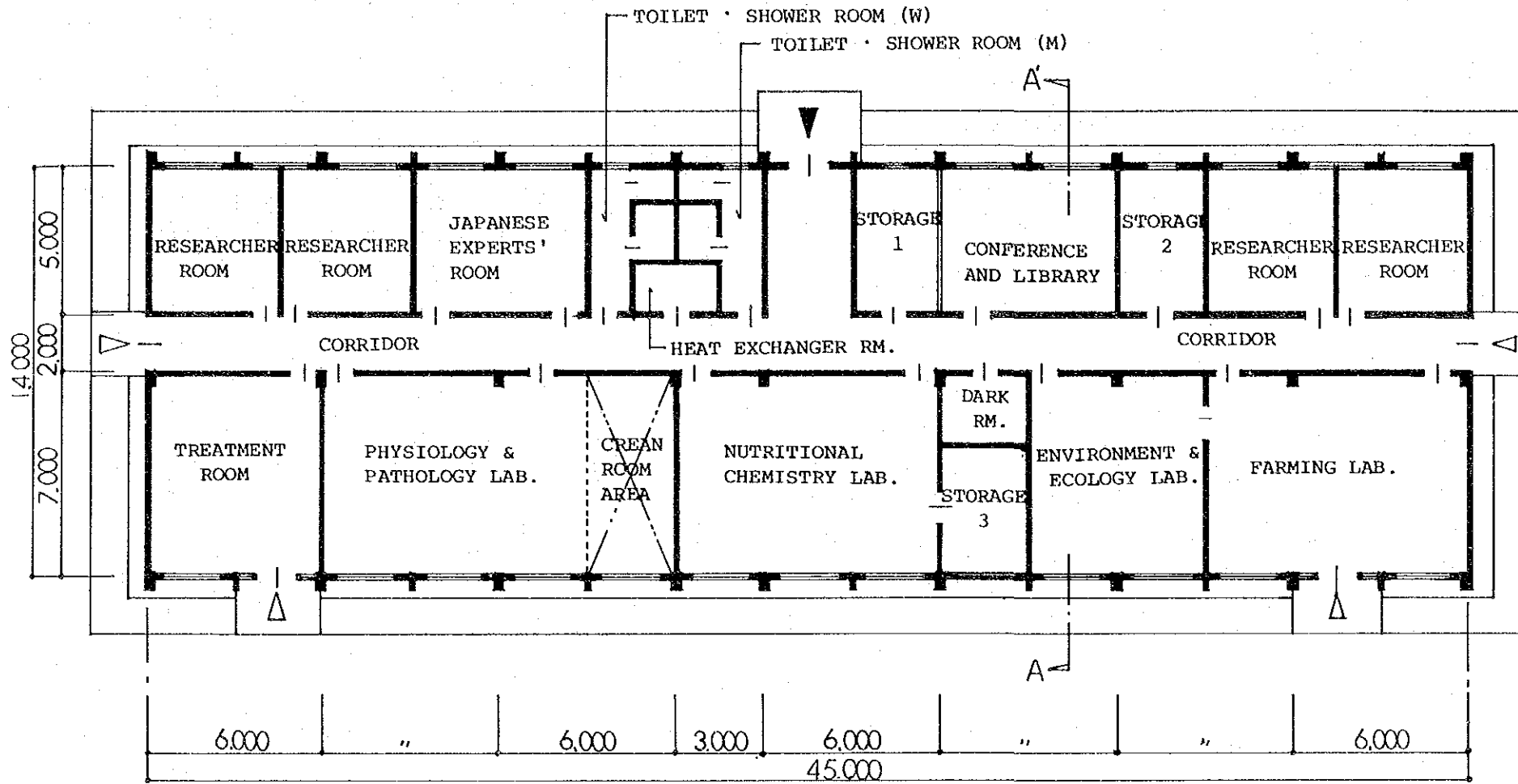
PLAN 1/200



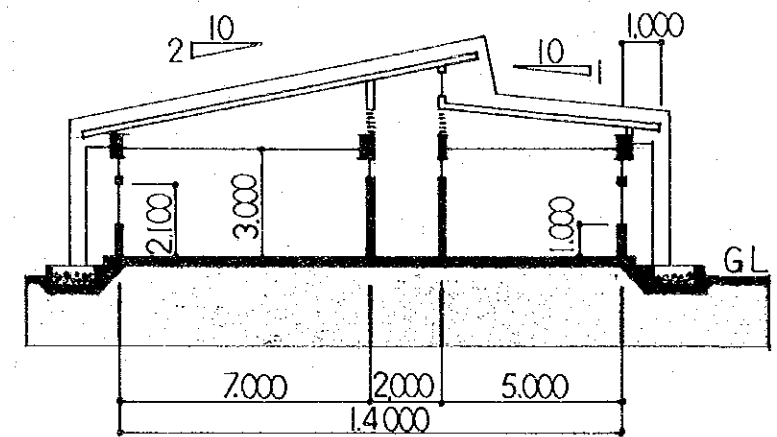
A-A' SECTION 1/200



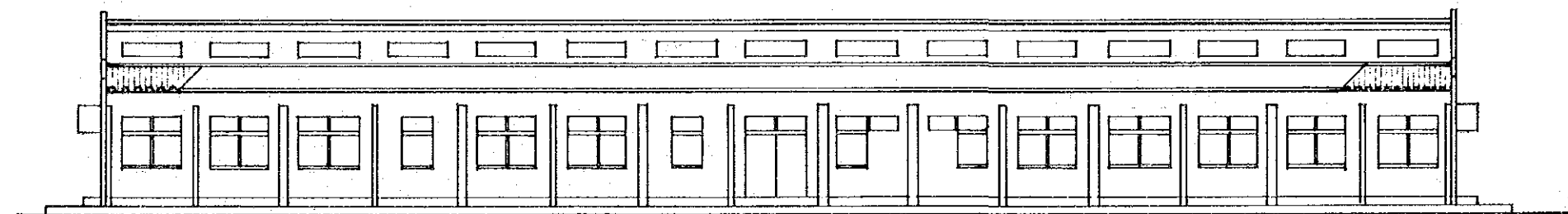
NORTH ELEVATION 1/200



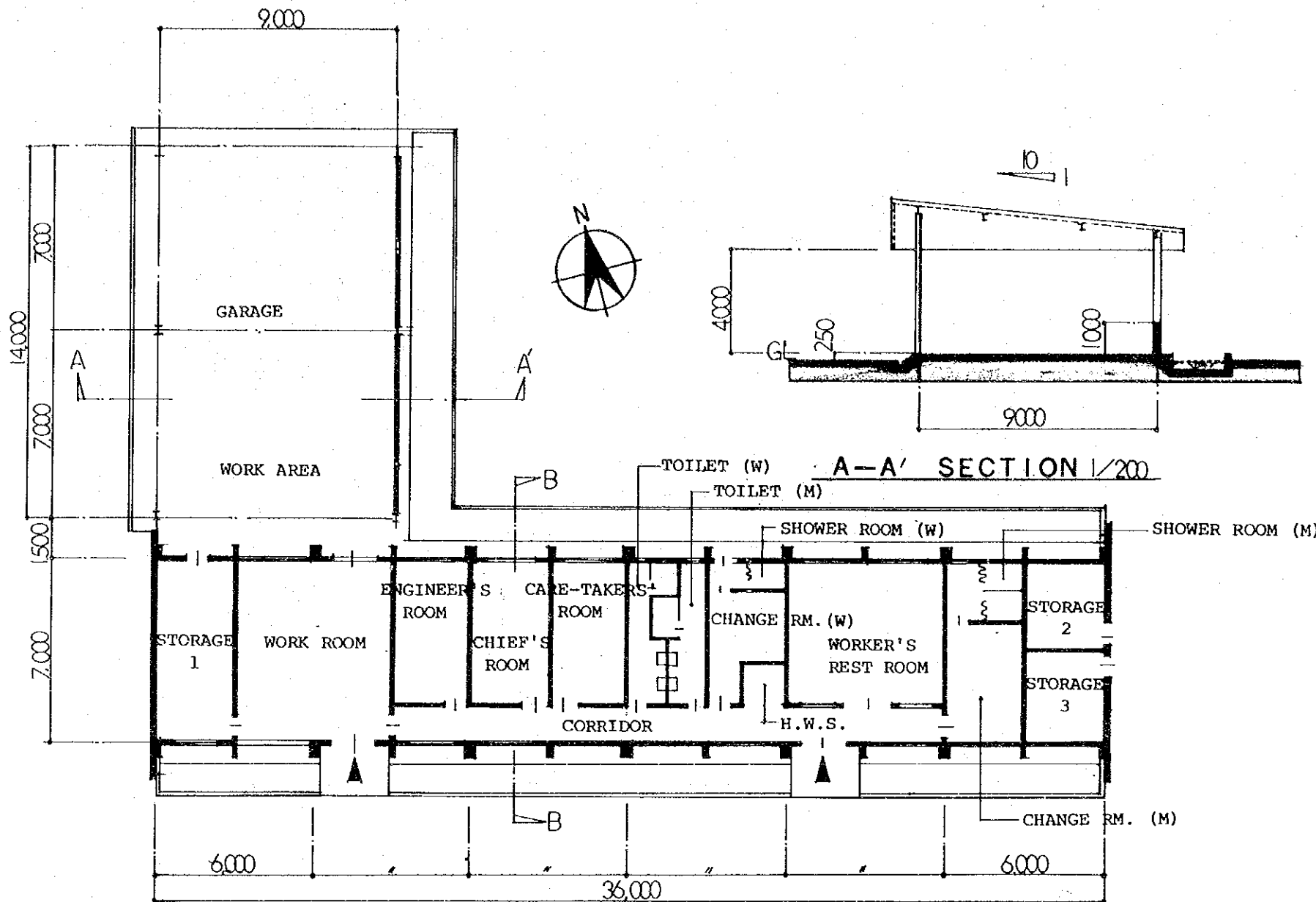
PLAN 1/200



A-A' SECTION 1/200



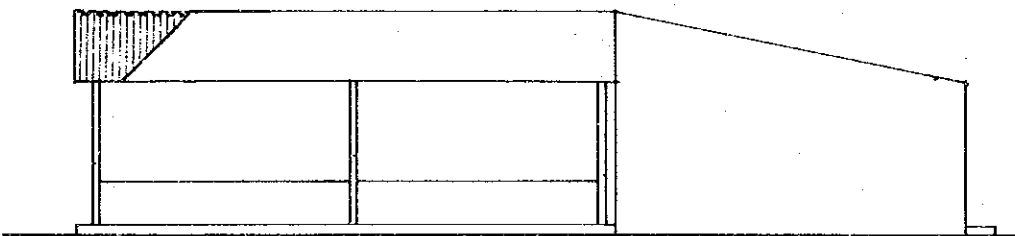
NORTH ELEVATION 1/200



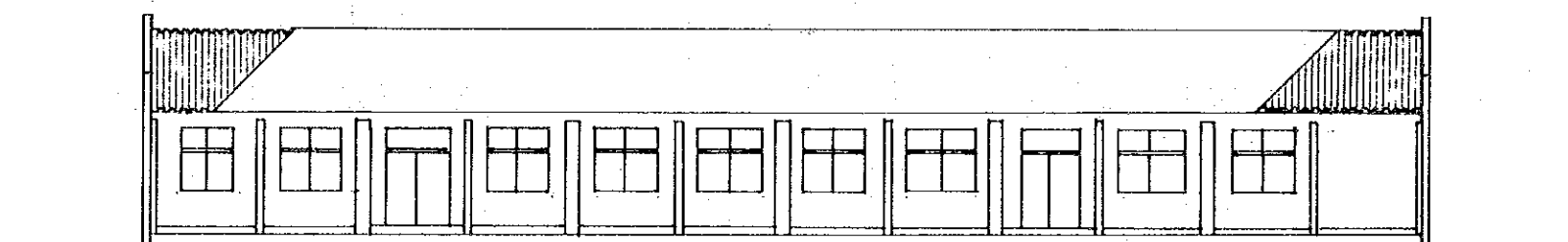
PLAN 1/200

A-A' SECTION 1/200

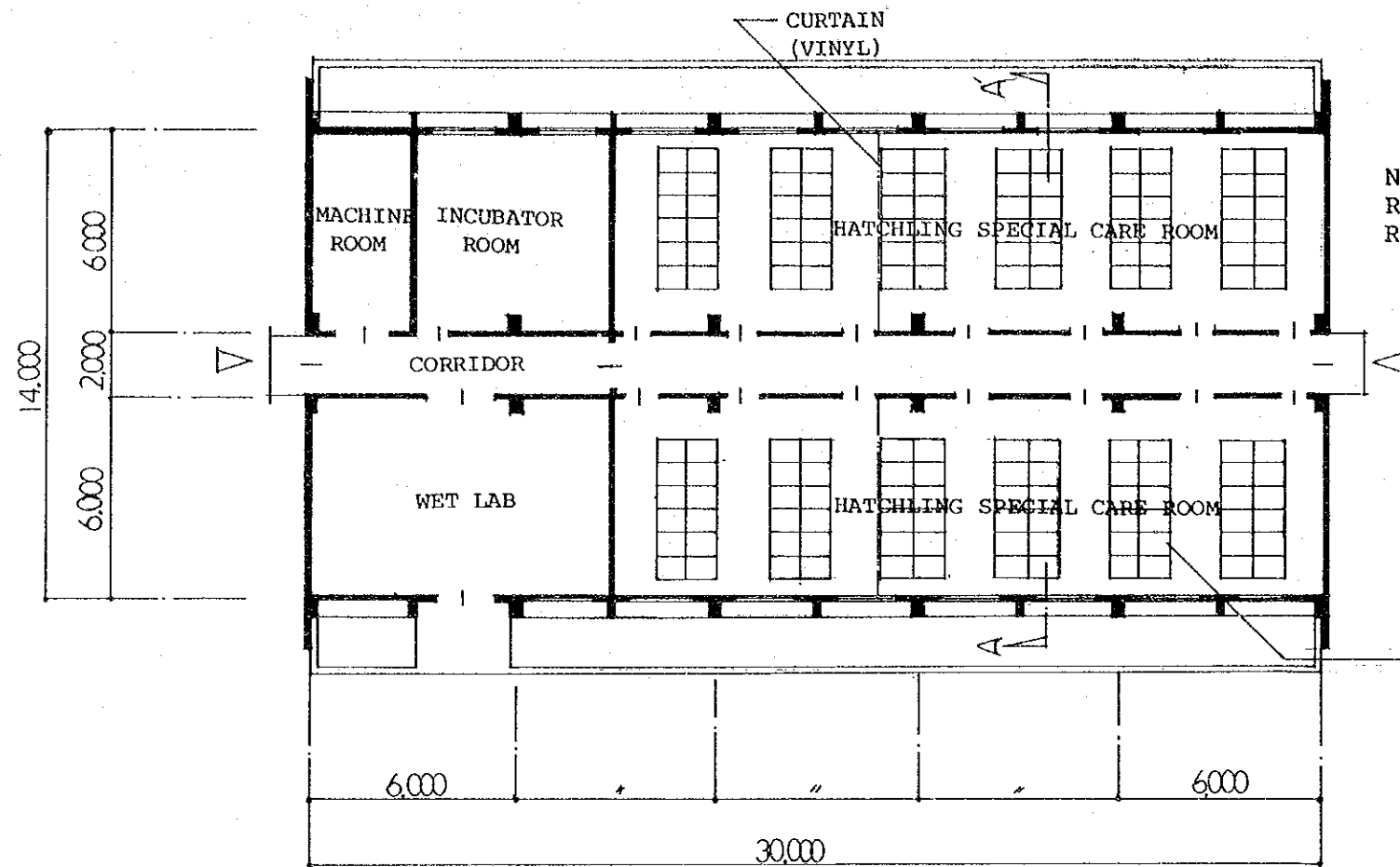
B-B' SECTION 1/200



WEST ELEVATION 1/200

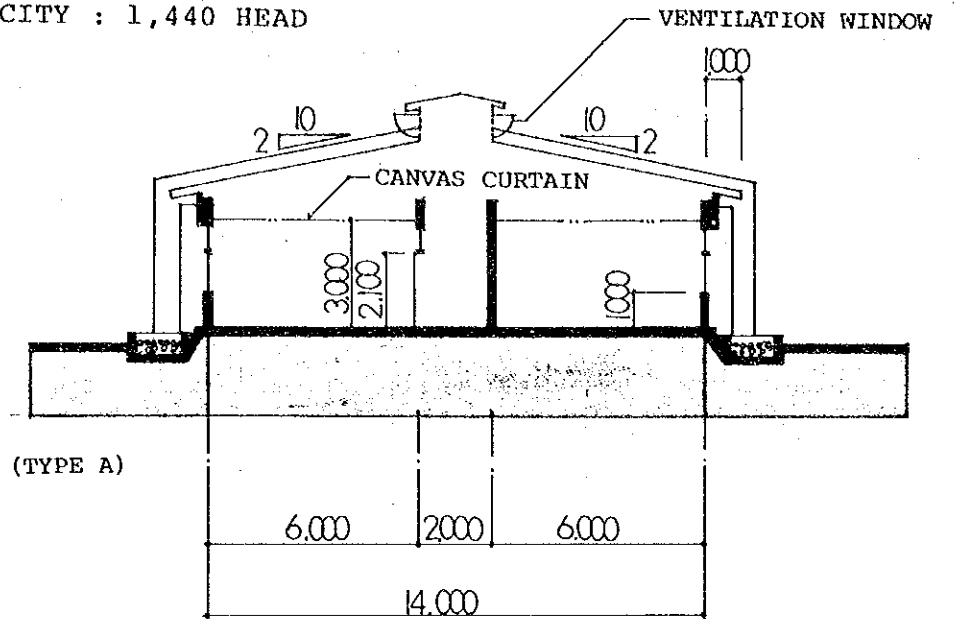


SOUTH ELEVATION 1/200

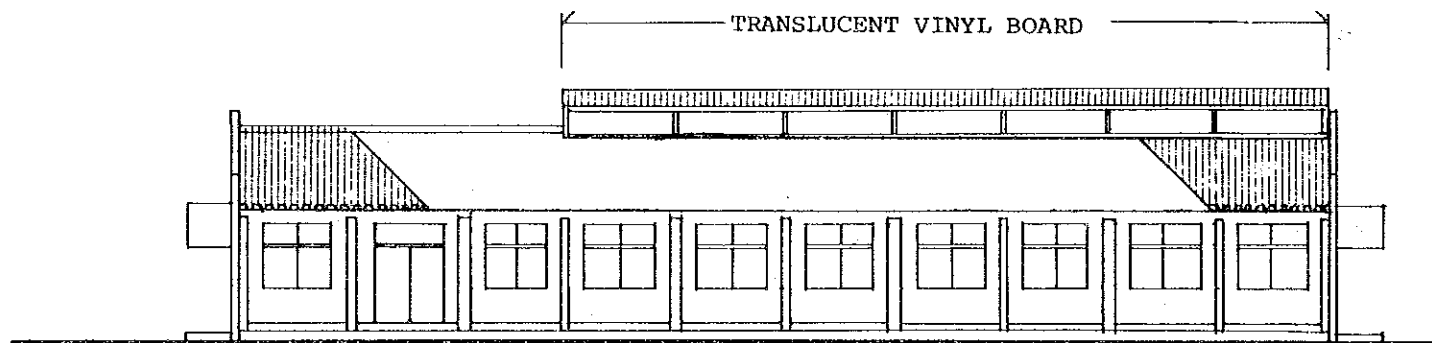


PLAN 1/200

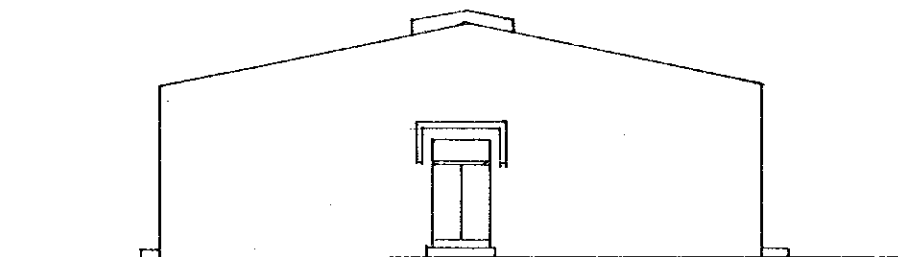
NURSERY TANK : 144 (A TYPE TANK)
 REARING DENSITY : 20 H/M²
 REARING CAPACITY : 1,440 HEAD



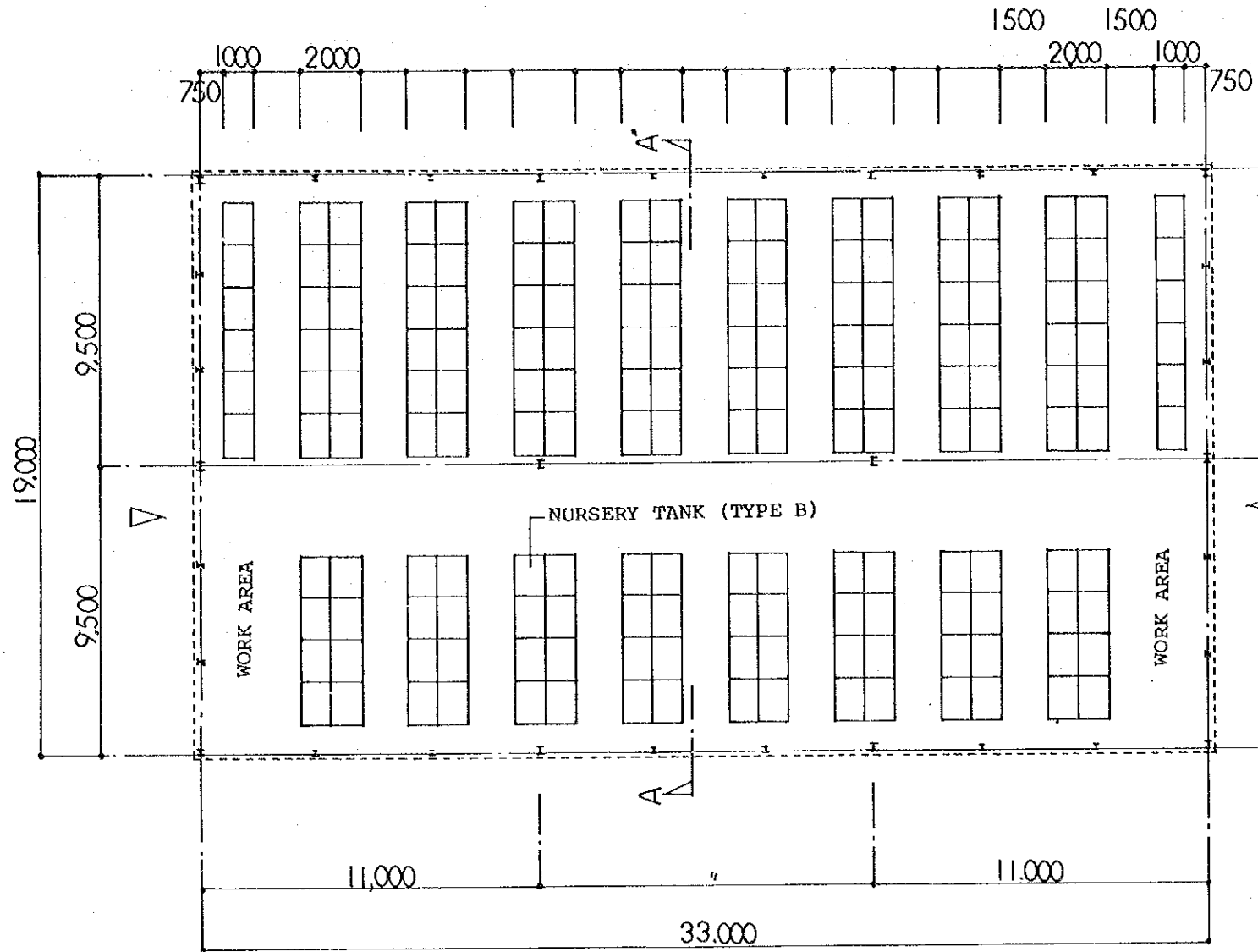
A-A' SECTION 1/200



SOUTH ELEVATION 1/200



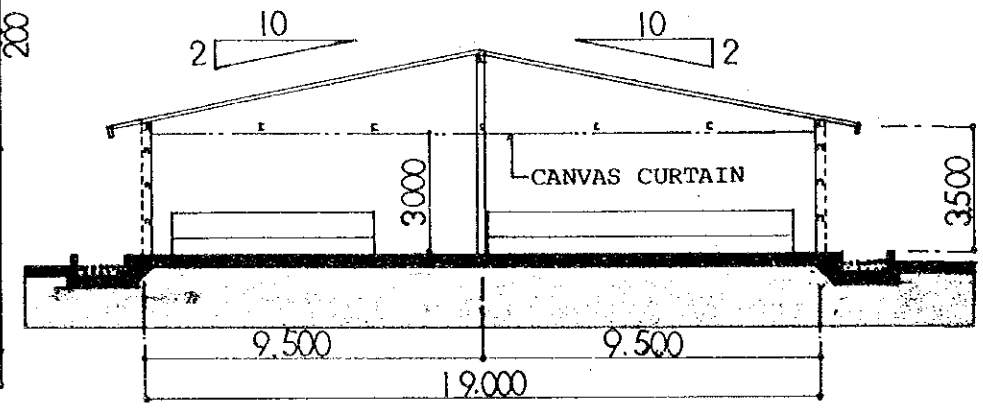
WEST ELEVATION 1/200



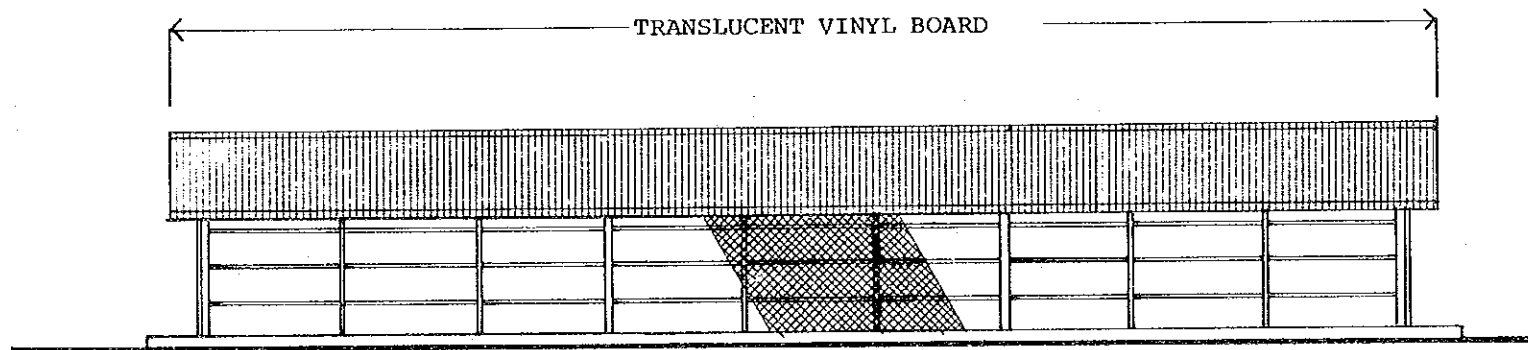
PLAN 1/200



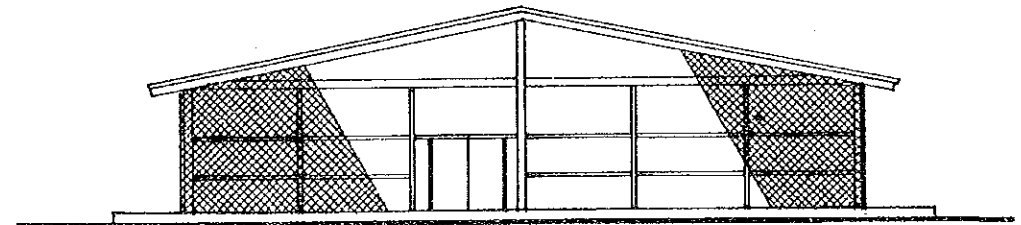
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 REARING DENSITY : 14 H/M²
 REARING CAPACITY : 2,380 HEAD



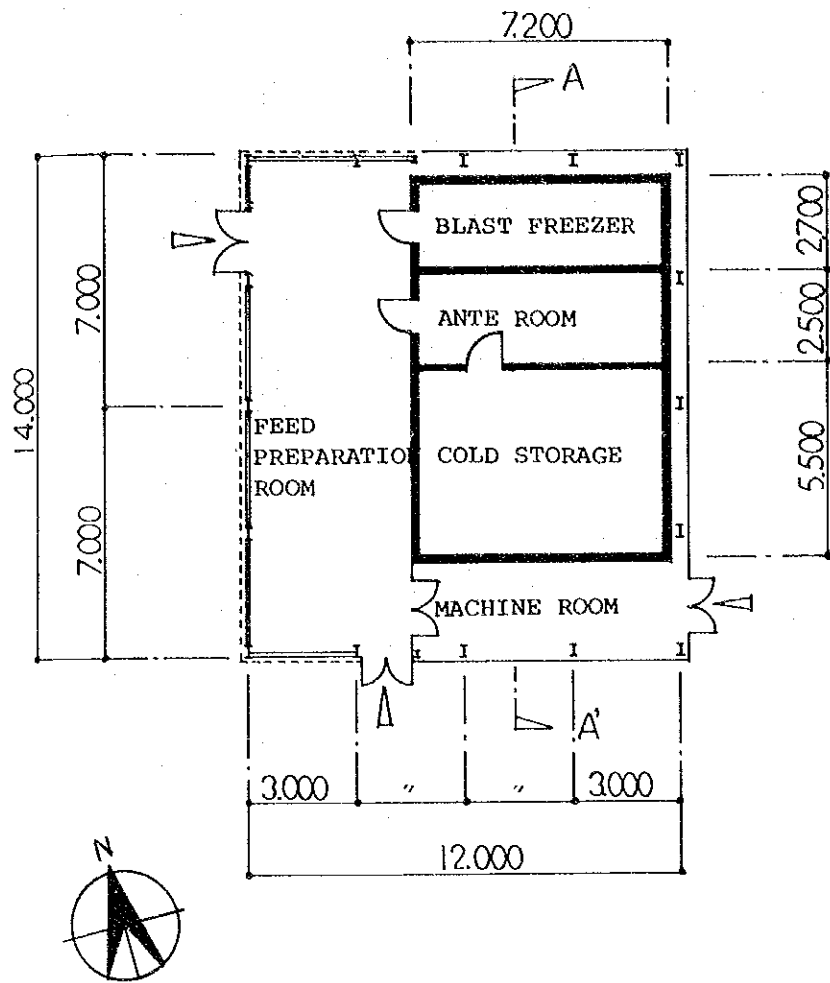
A-A' SECTION 1/200



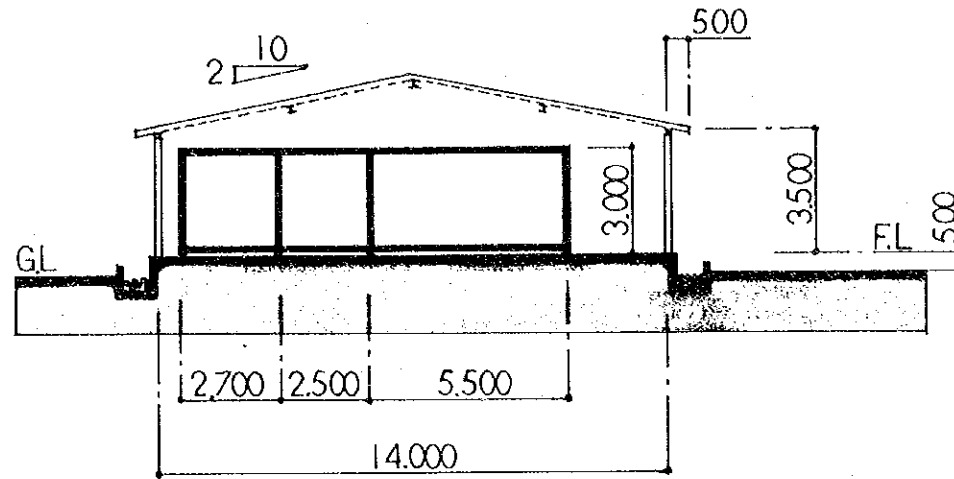
SOUTH ELEVATION 1/200



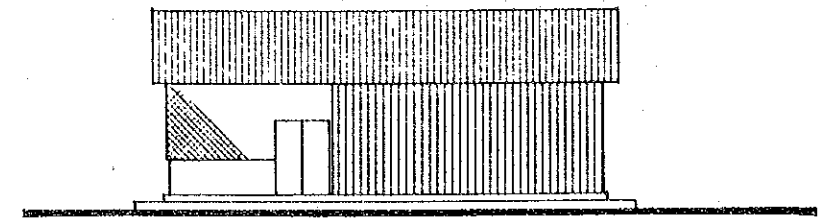
WEST ELEVATION 1/200



PLAN 1/200

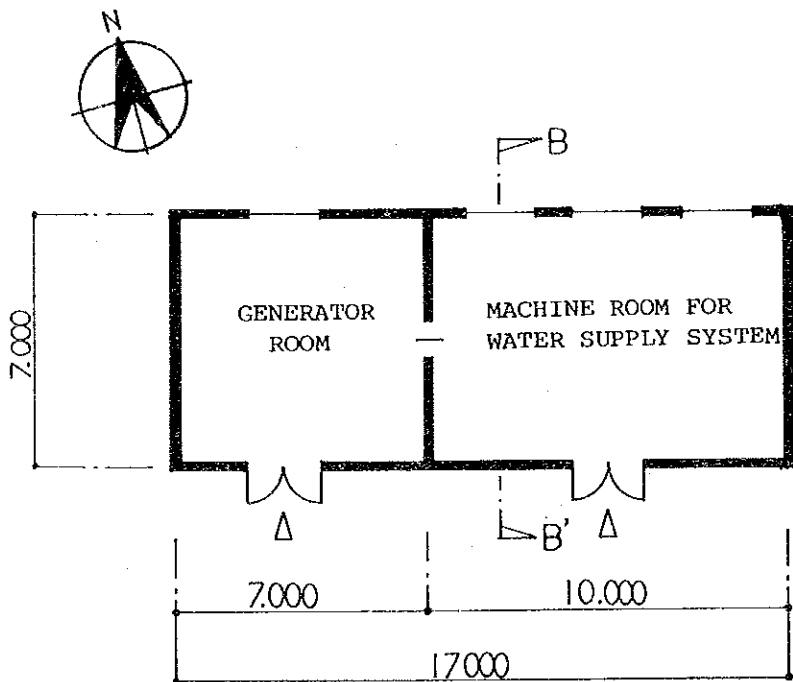


A-A' SECTION 1/200

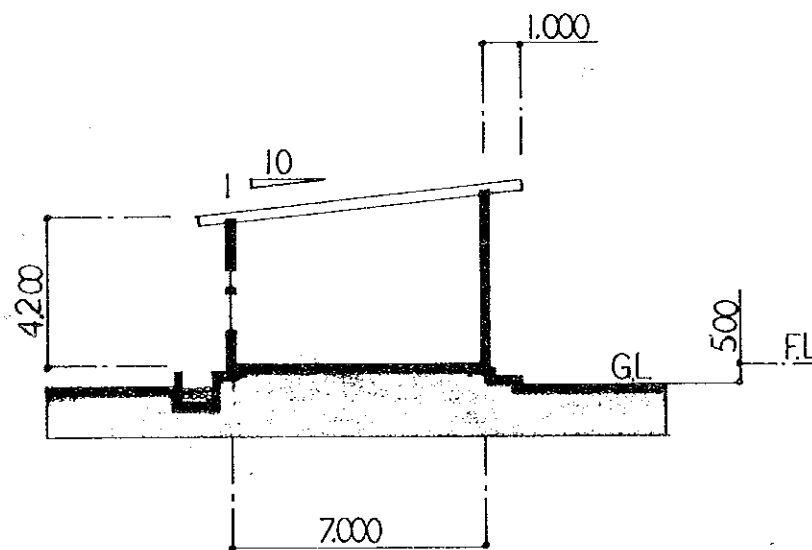


SOUTH ELEVATION 1/200

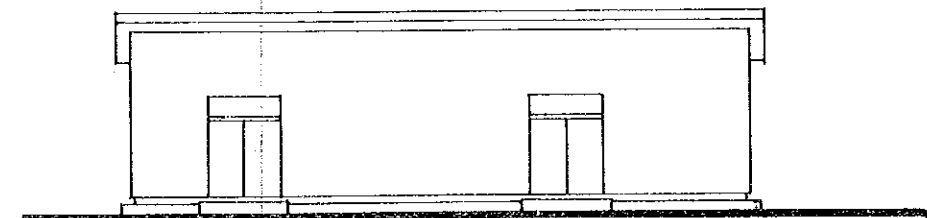
FEED HOUSE



PLAN 1/200

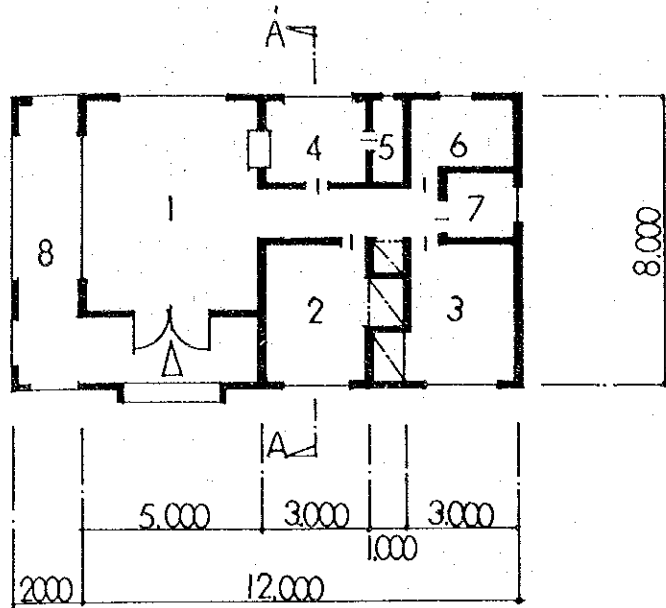


B-B' SECTION 1/200



SOUTH ELEVATION 1/200

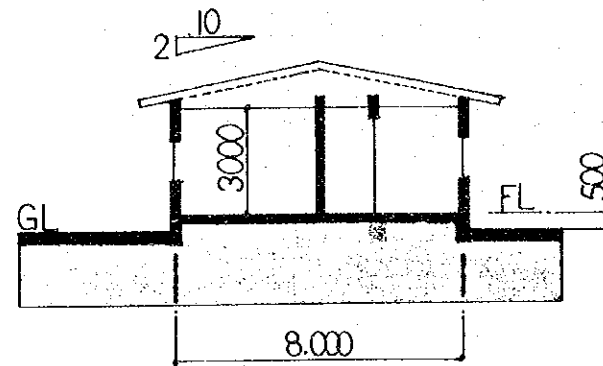
MACHINE HOUSE



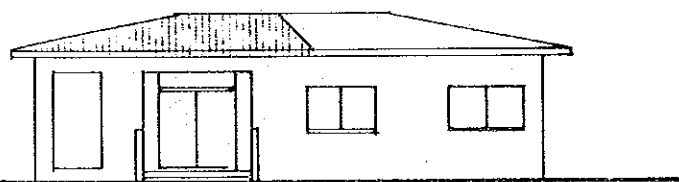
PLAN 1/200



JAPANESE EXPERT'S HOUSE



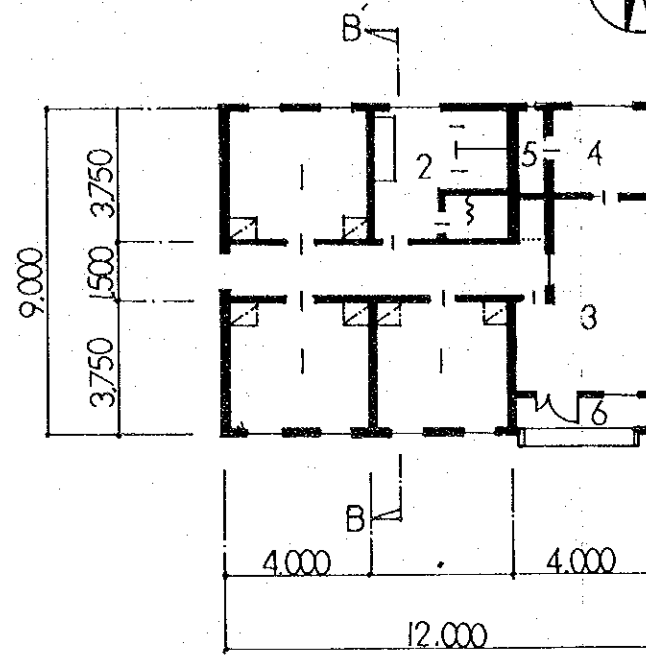
A-A' SECTION 1/200



SOUTH ELEVATION 1/200

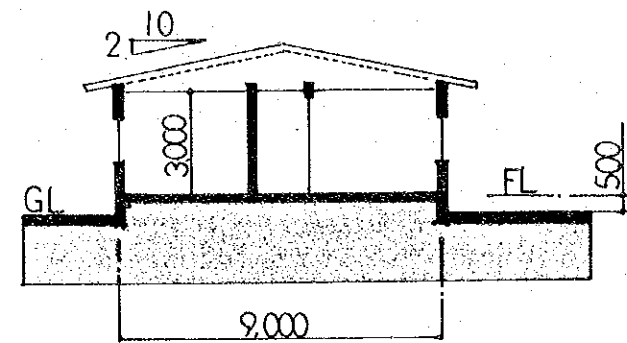
1. LIVING, DINING ROOM
2. BED ROOM NO.1
3. BED ROOM NO.2
4. KITCHEN
5. STORAGE
6. BATH ROOM
7. TOILET
8. TERRACE

DORMITORY FOR PROMOTERS UNDER TRAINING

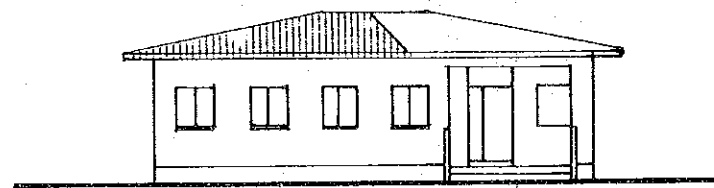


PLAN 1/200

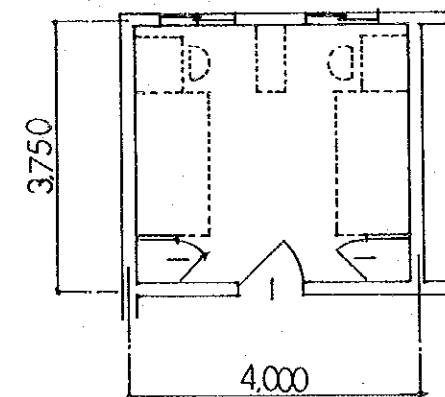
1. PRIVATE ROOM
2. BATH ROOM
3. LIVING, DINING ROOM
4. KITCHEN
5. STORAGE
6. ENTRANCE PORCH



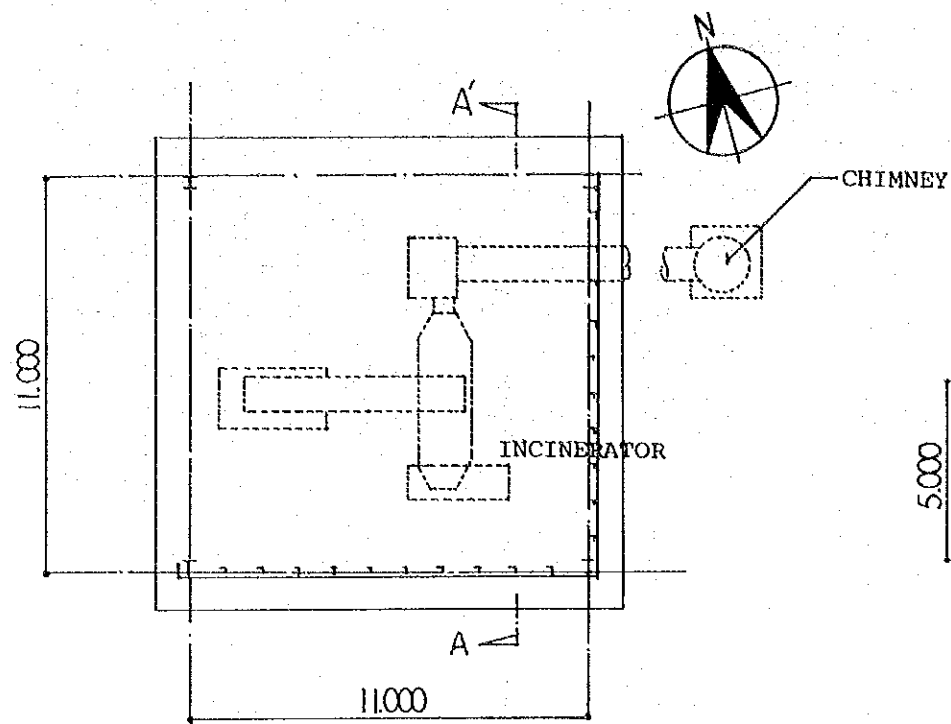
B-B' SECTION 1/200



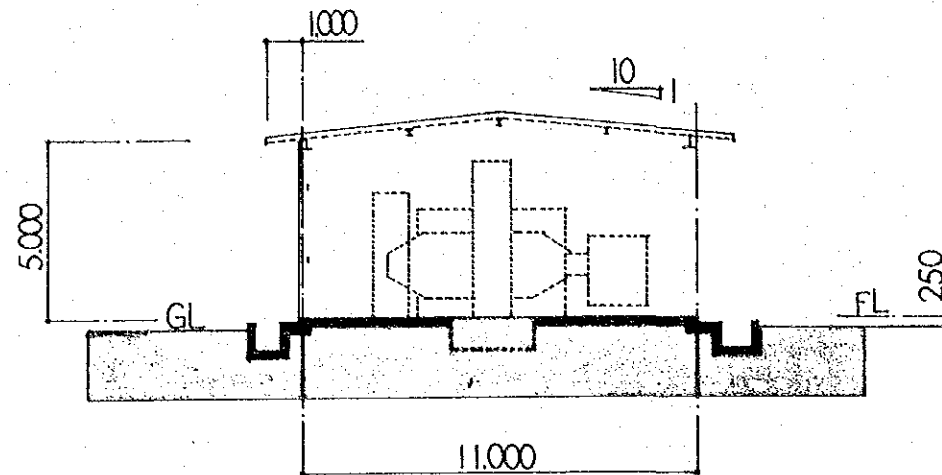
SOUTH ELEVATION 1/200



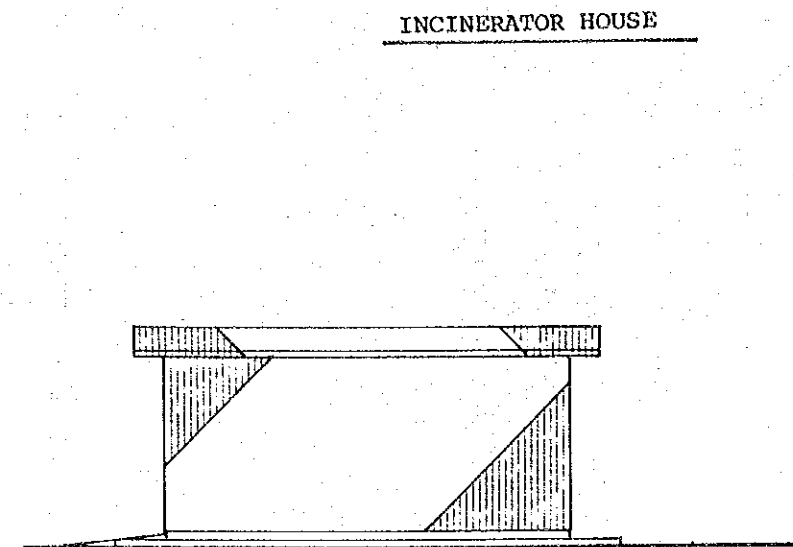
PRIVATE ROOM PLAN 1/200



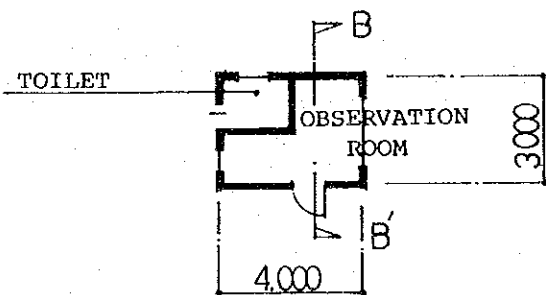
PLAN 1/200



A-A' SECTION 1/200

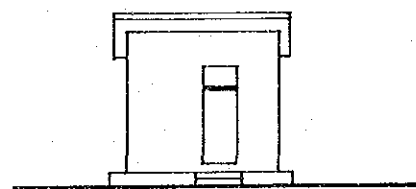


SOUTH ELEVATION 1/200

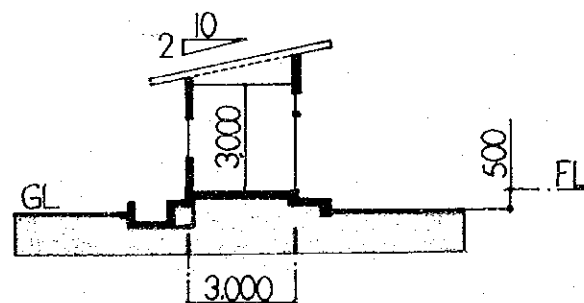


PLAN 1/200

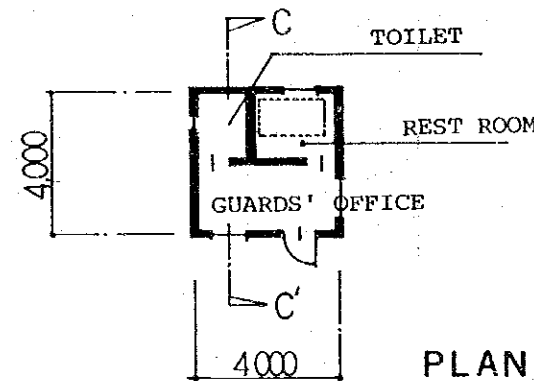
OBSERVATION HOUSE (I, II)



ELEVATION 1/200

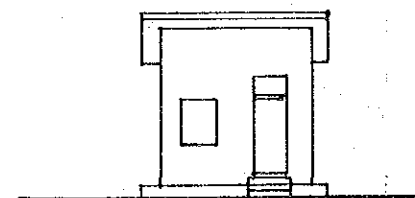


B-B' SECTION 1/200

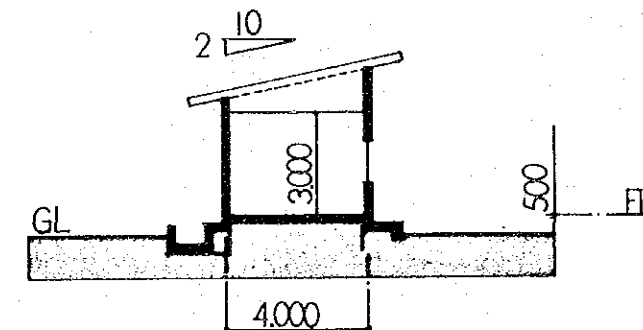


PLAN 1/200

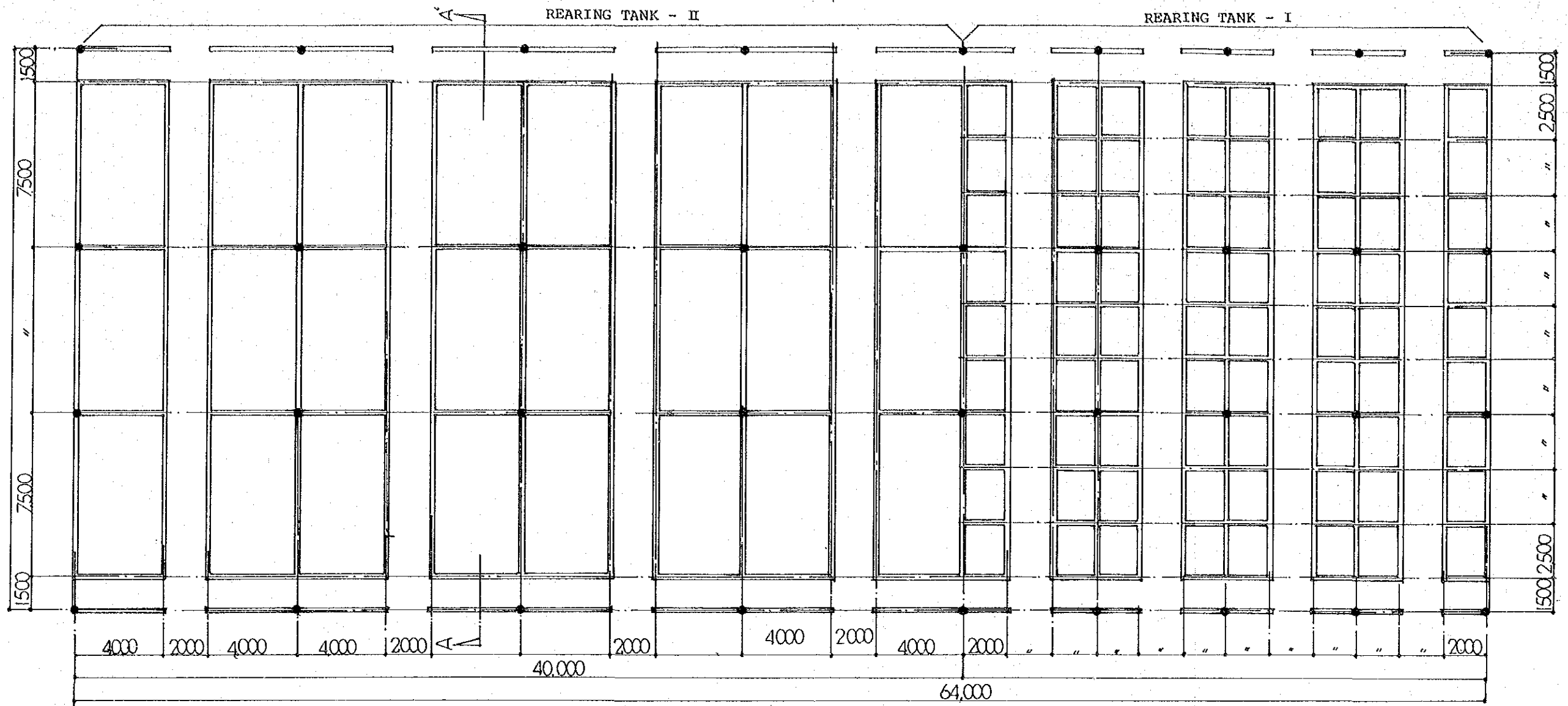
GATE HOUSE



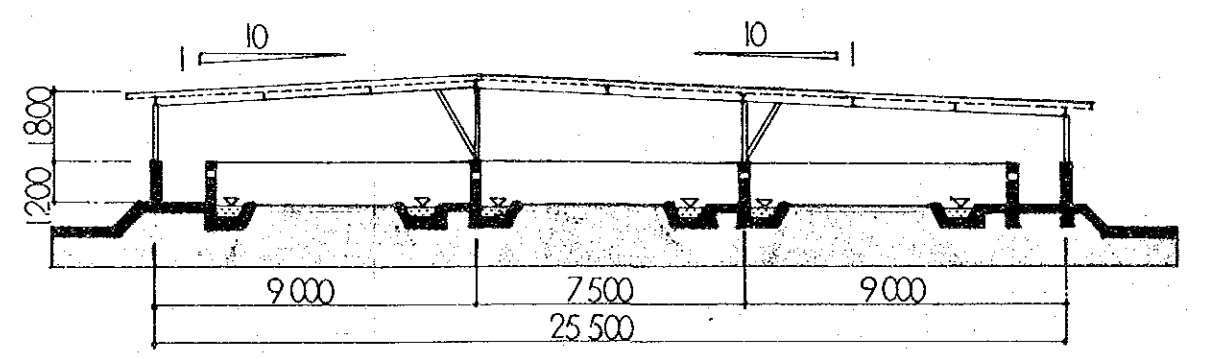
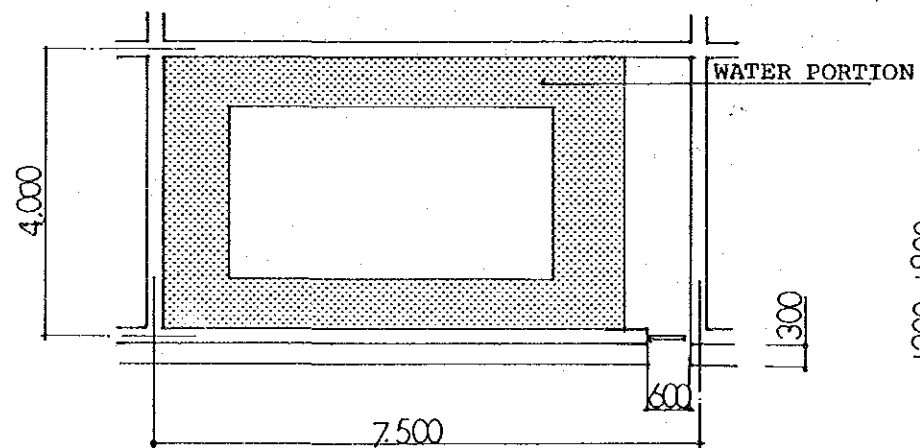
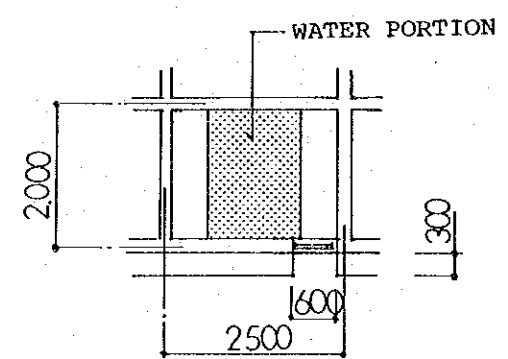
ELEVATION 1/200



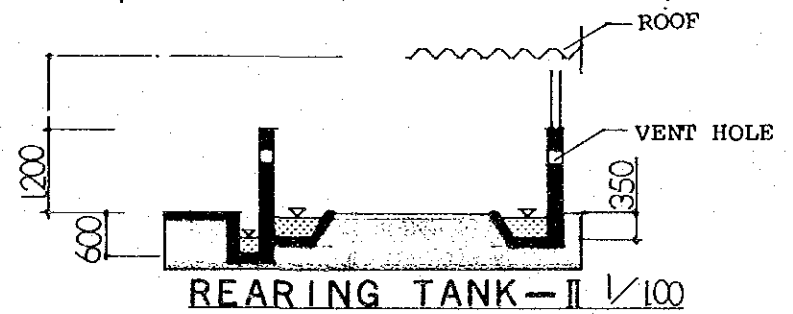
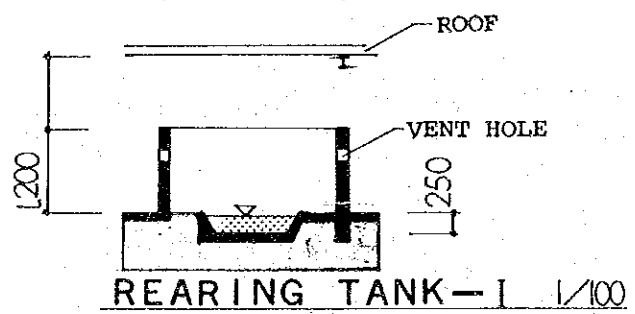
C-C' SECTION 1/200

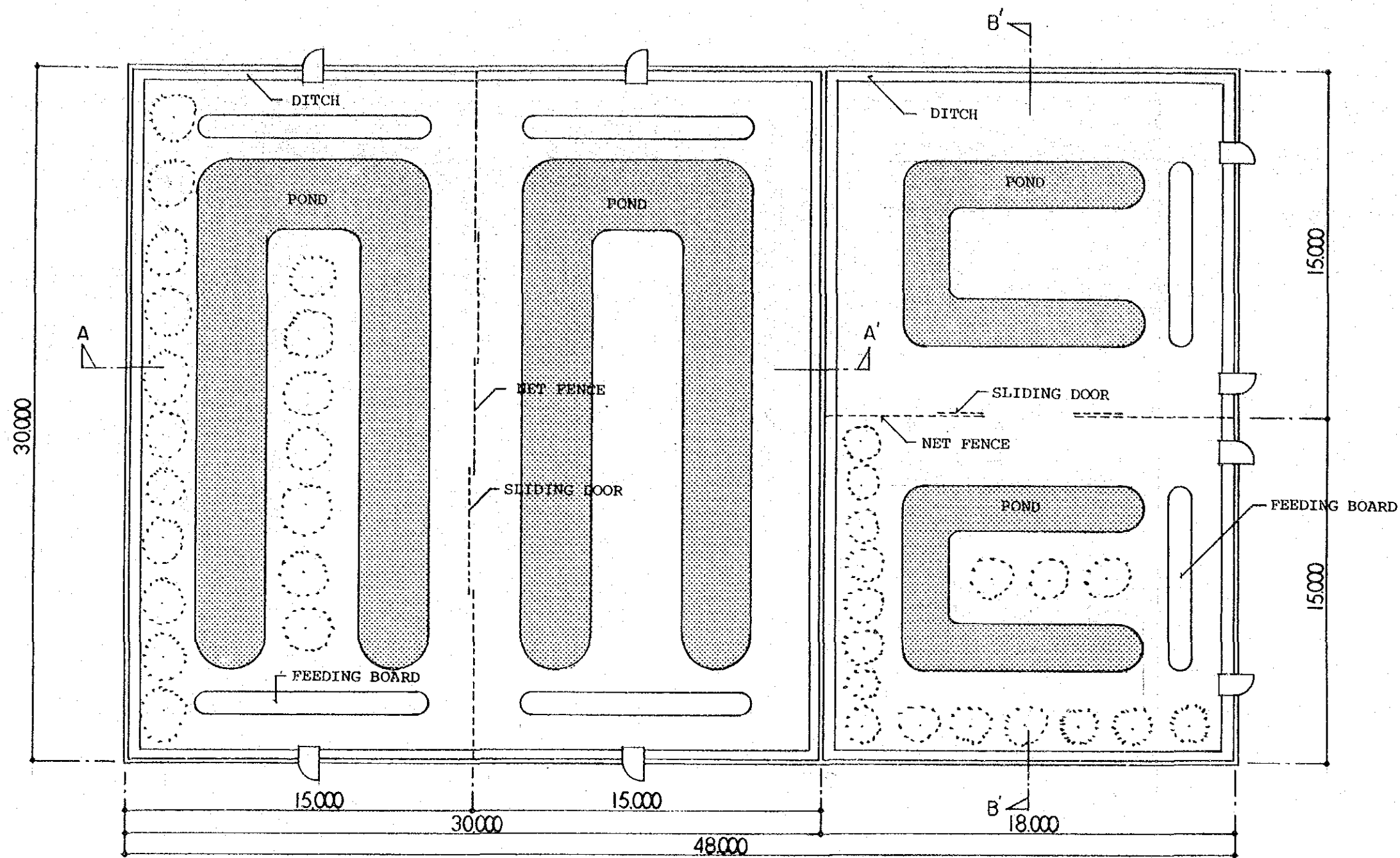


PLAN 1/200

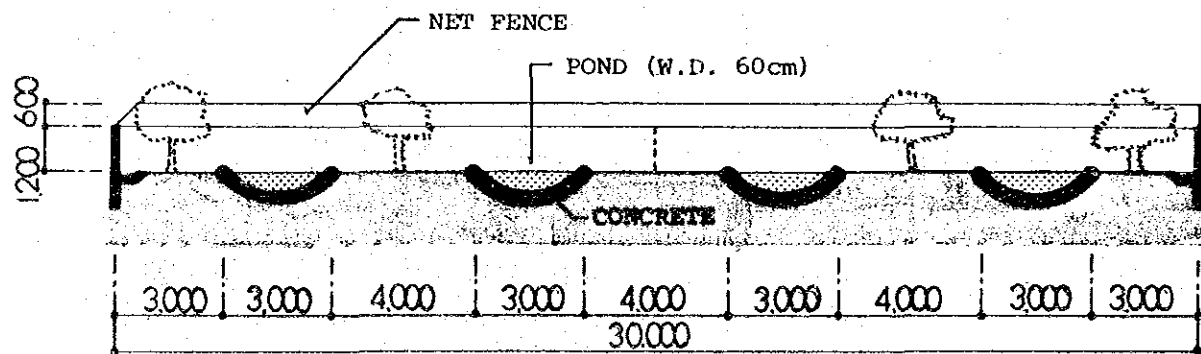


A-A' SECTION 1/200

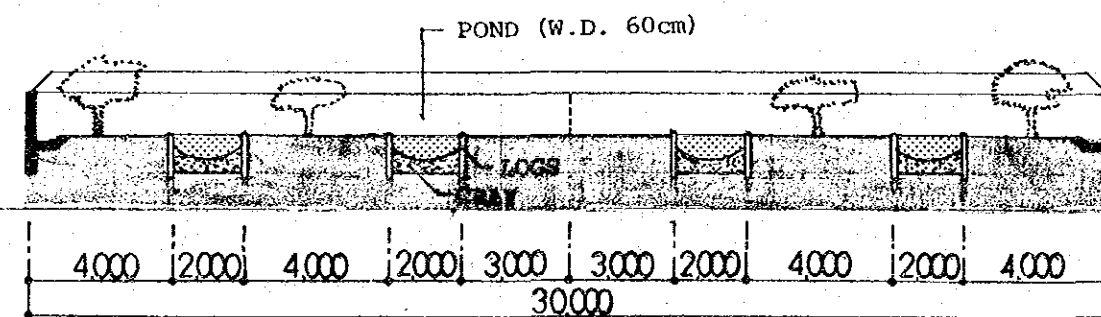




PLAN 1/200

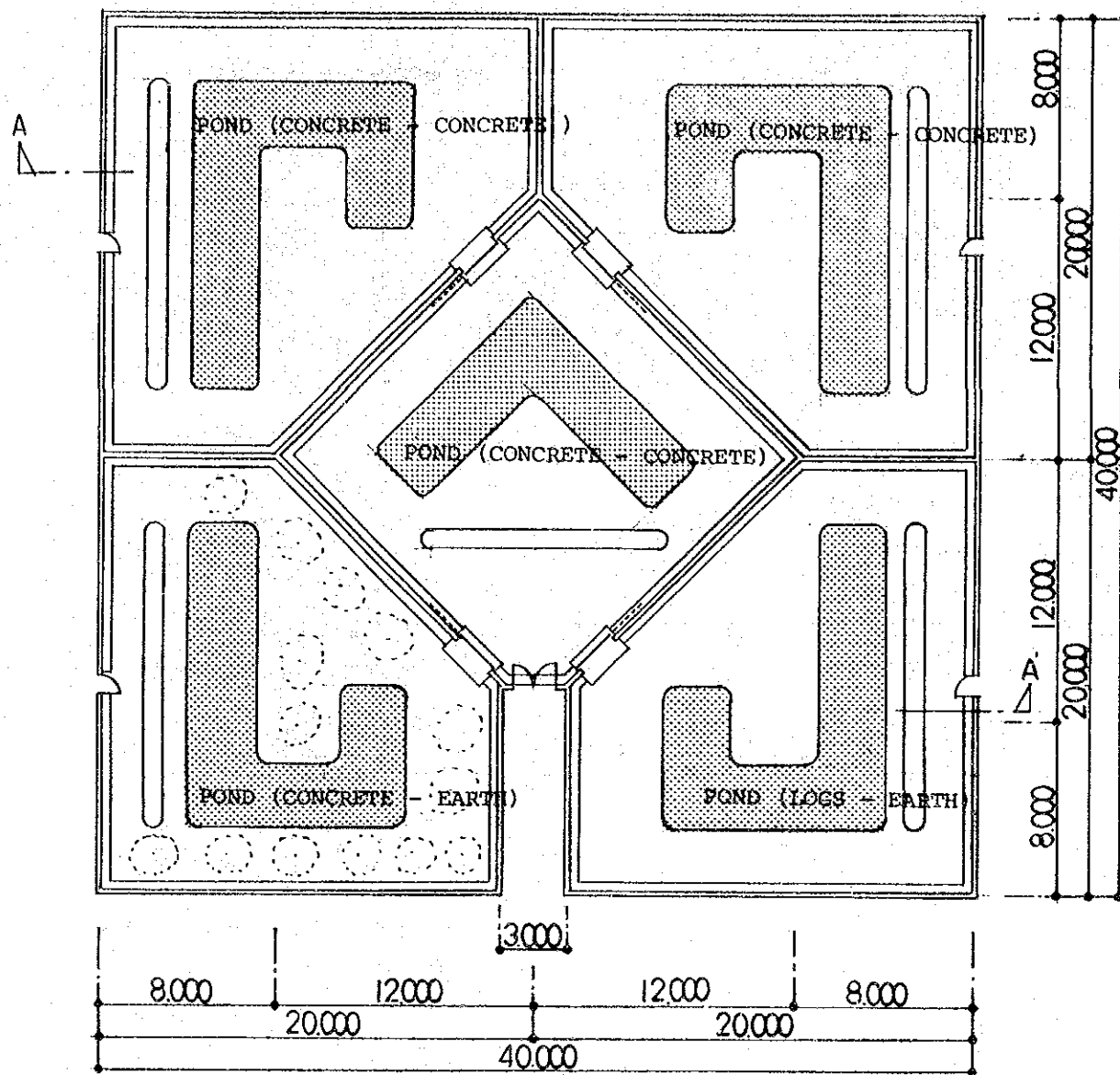


A-A' SECTION 1/200

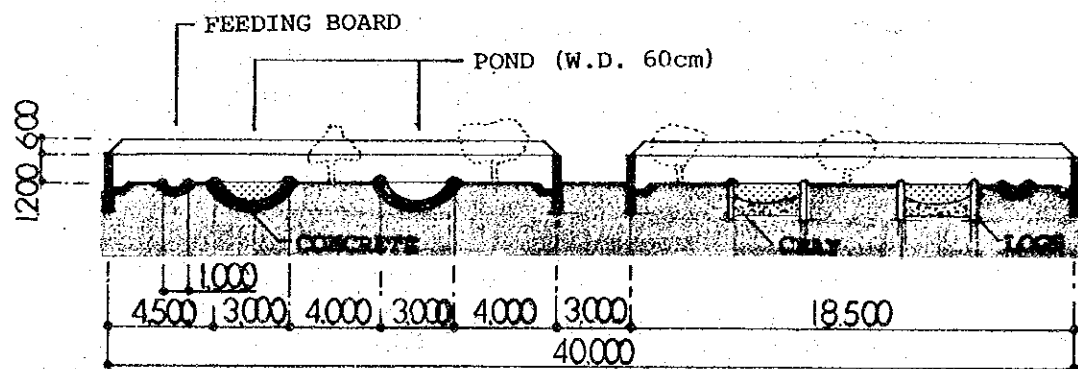


B-B' SECTION 1/200

REARING PEN - I

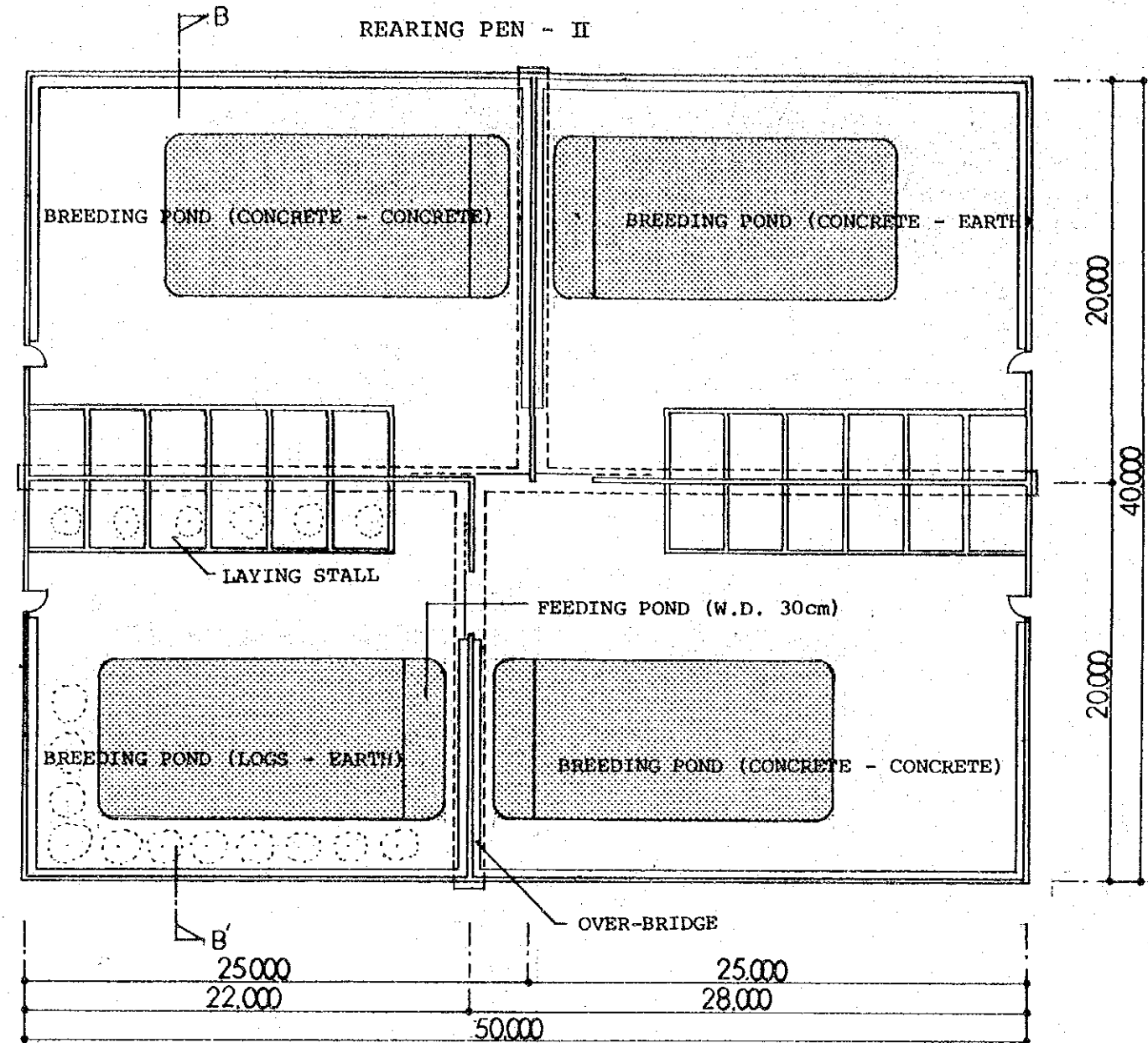


PLAN 1/300

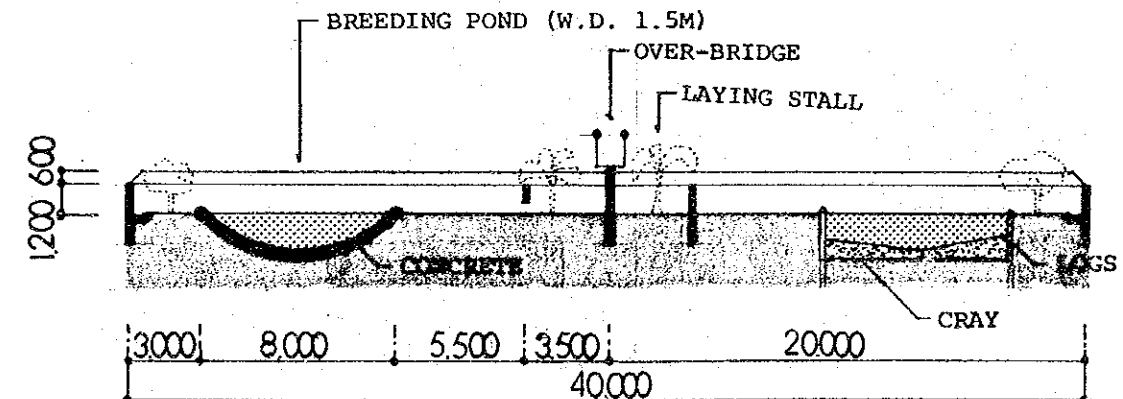


A-A' SECTION 1/300

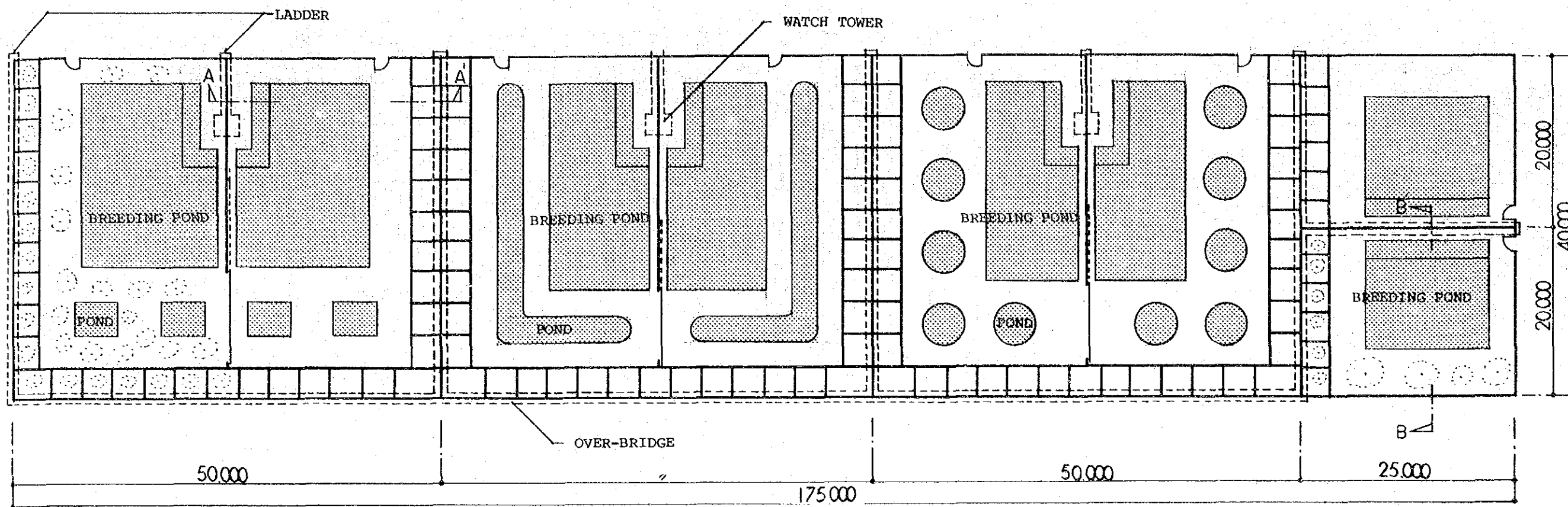
REARING PEN - II



PLAN 1/300



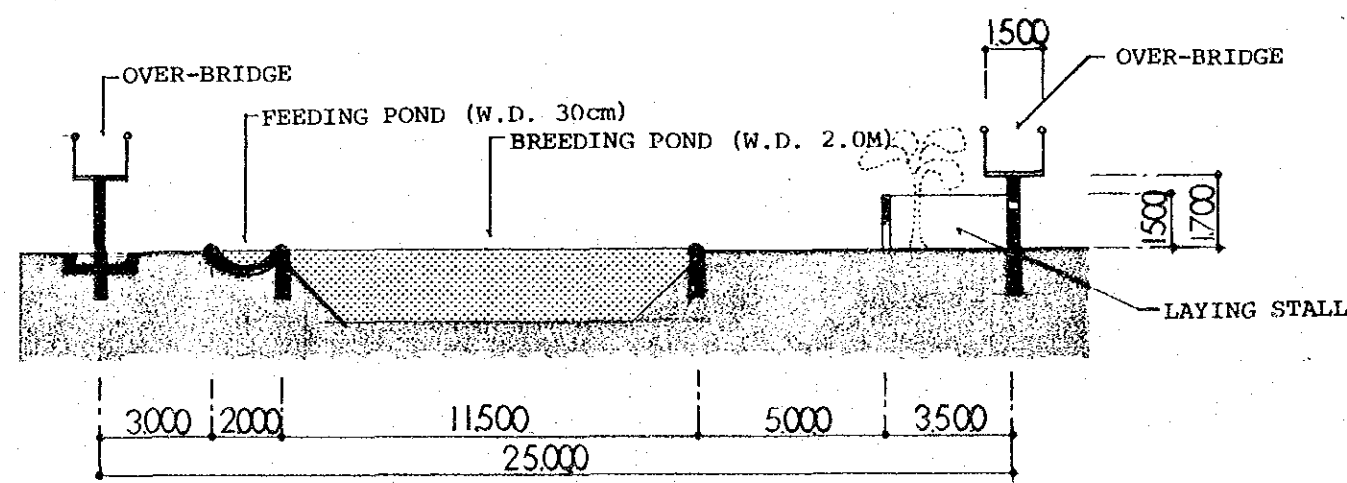
B-B' SECTION 1/300



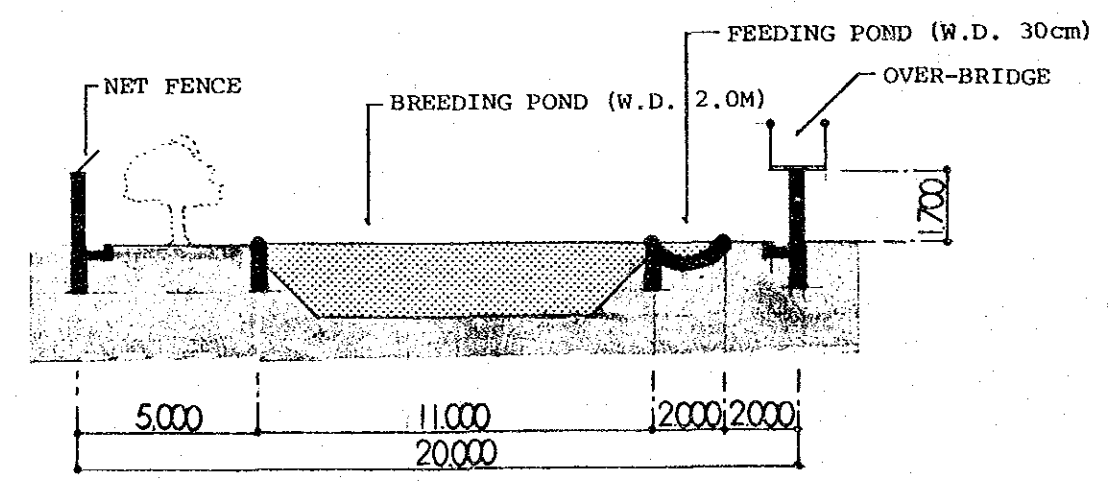
REARING HEAD : 65 HEAD
 REARING DENSITY : 0.0325 H/M²

PLAN 1/500

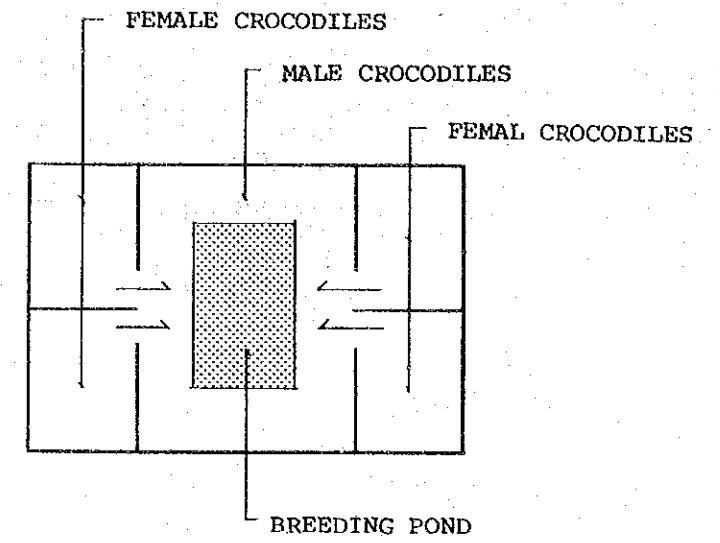
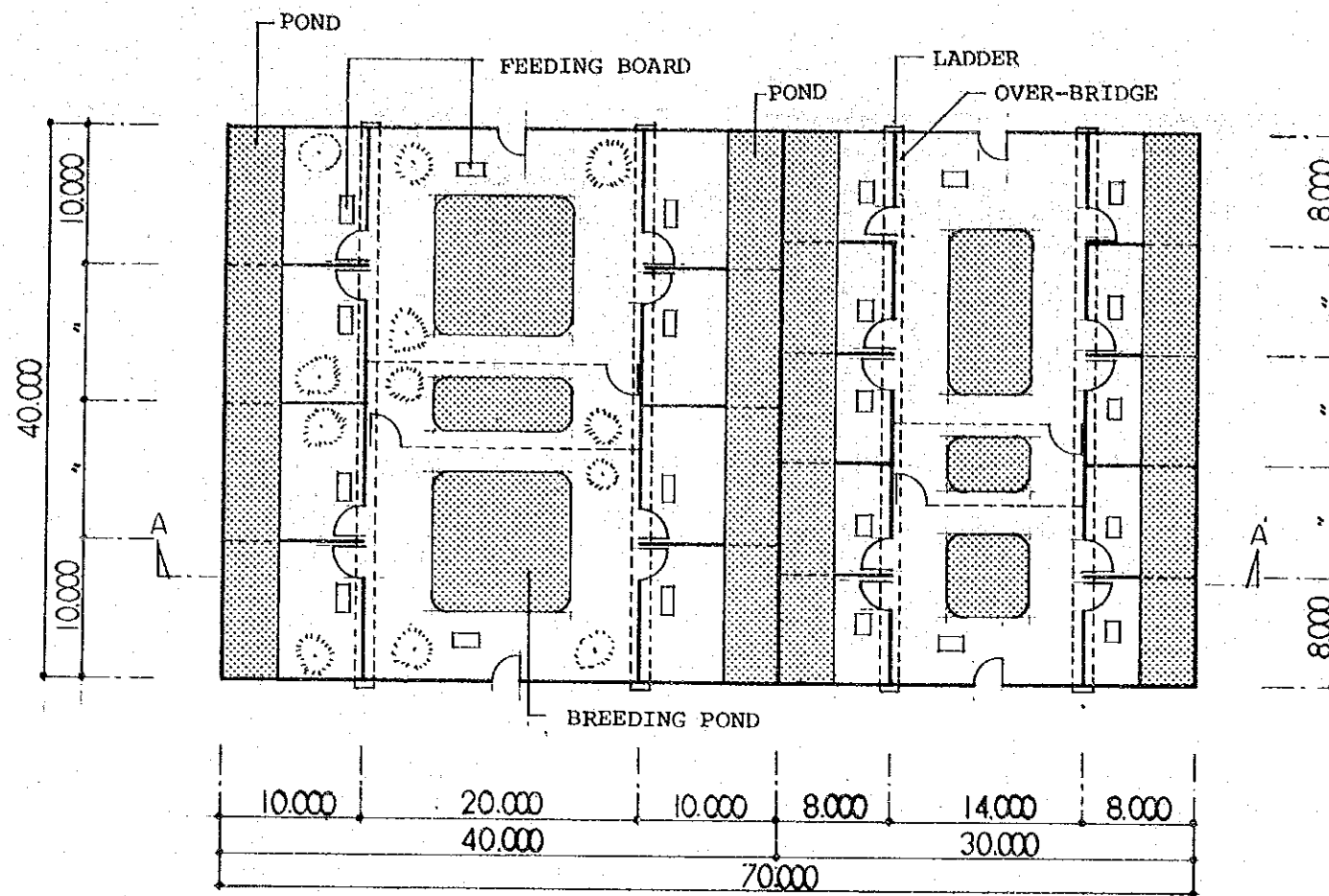
REARING HEAD : 12 HEAD
 REARING DENSITY : 0.024 H/M²



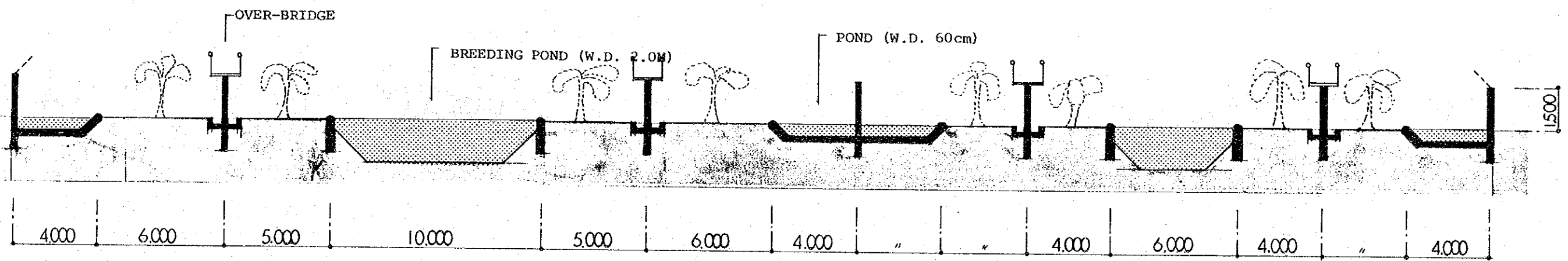
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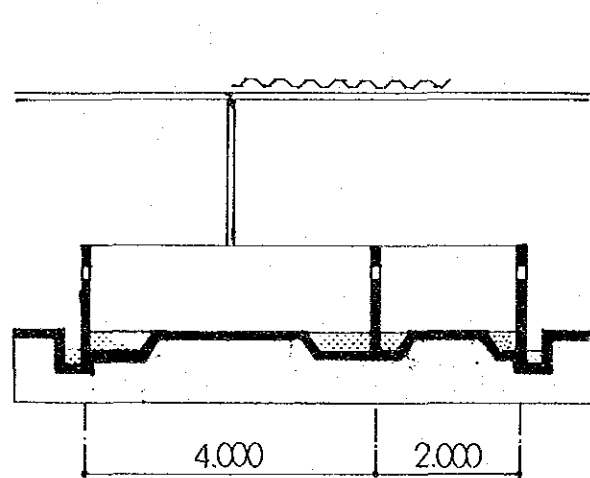
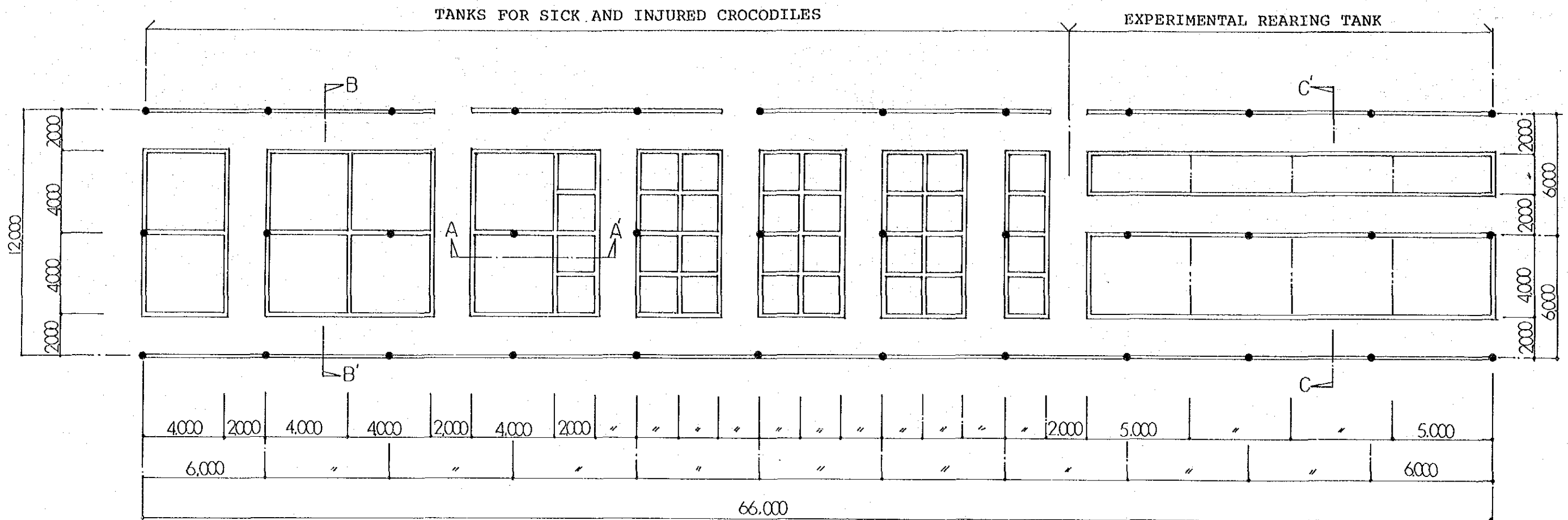
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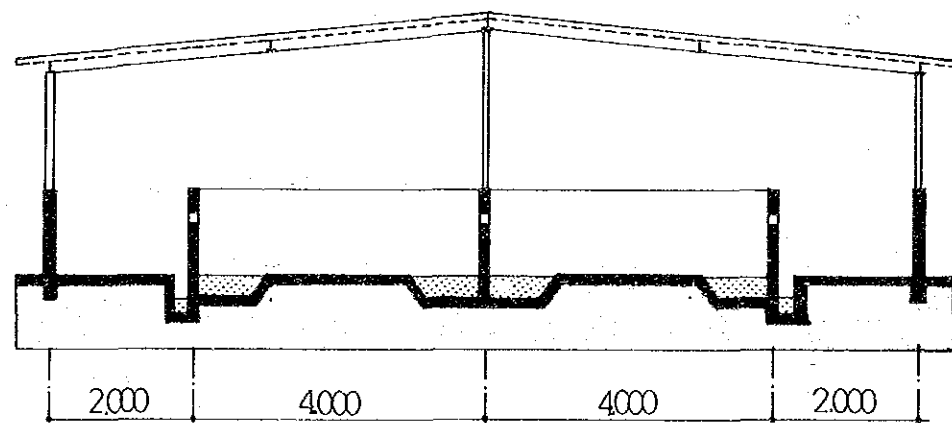
PLAN 1/500



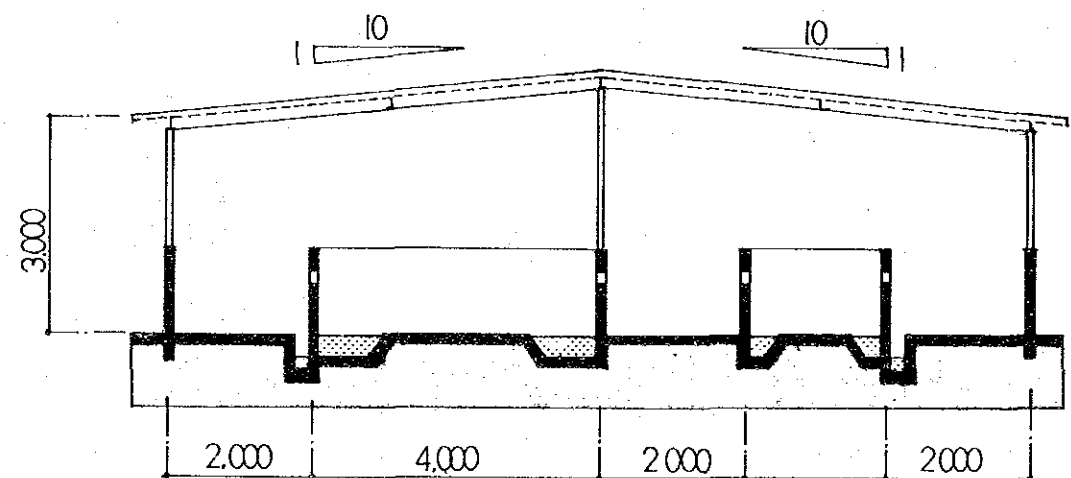
A-A' SECTION 1/200



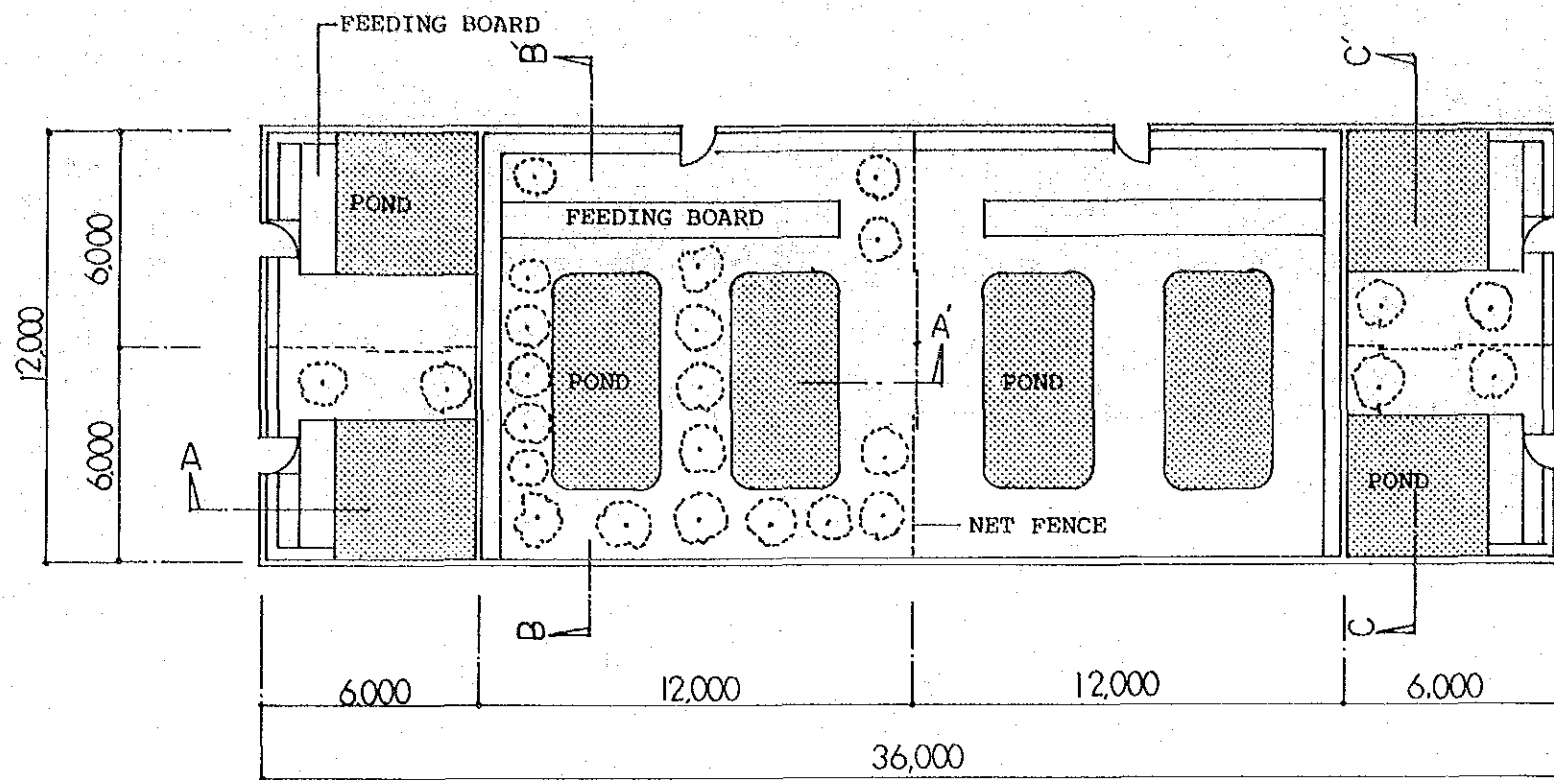
A-A' SECTION 1/100



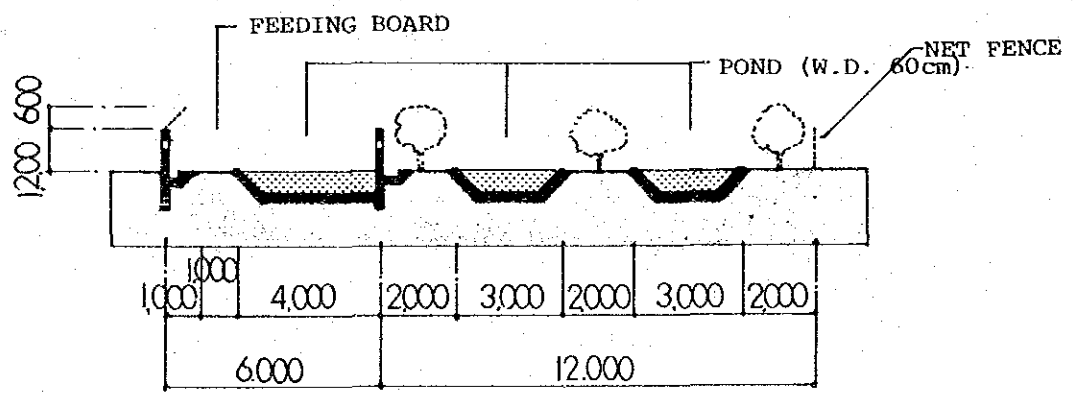
B-B' SECTION 1/100



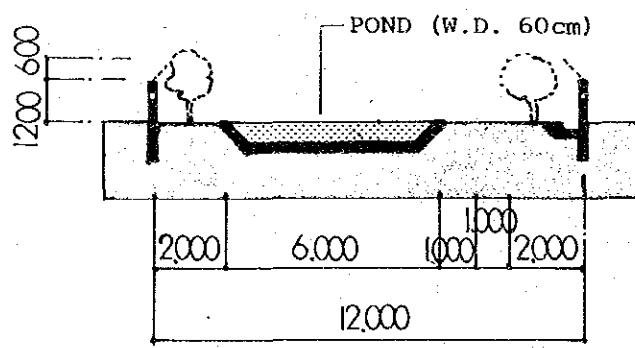
C-C' SECTION 1/100



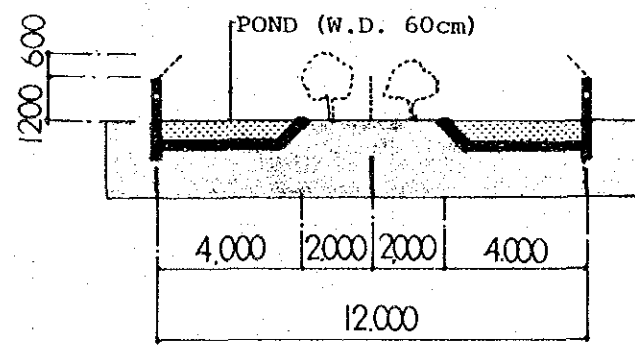
PLAN 1/200



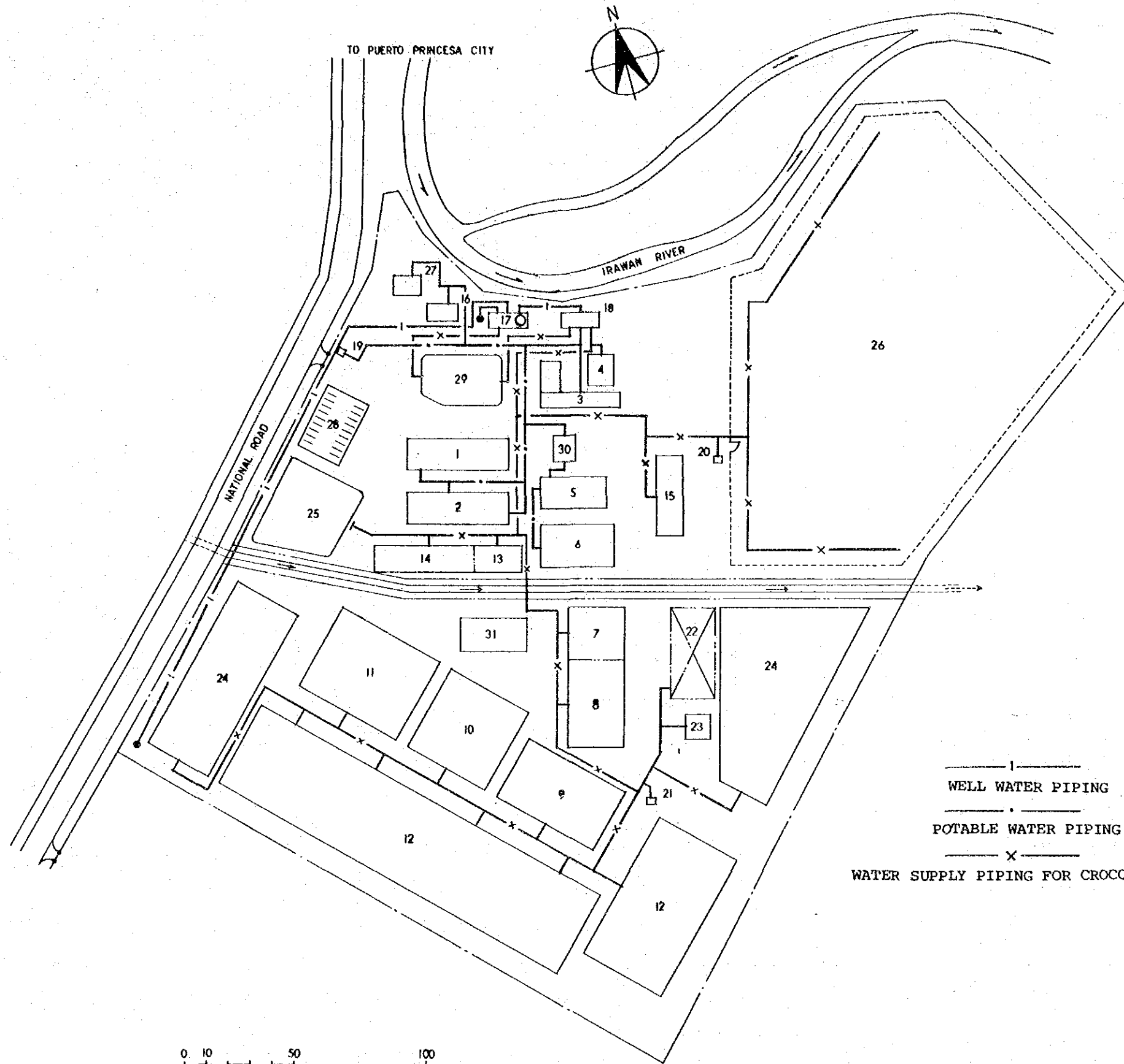
A-A' SECTION 1/200



B-B' SECTION 1/200



C-C' SECTION 1/200

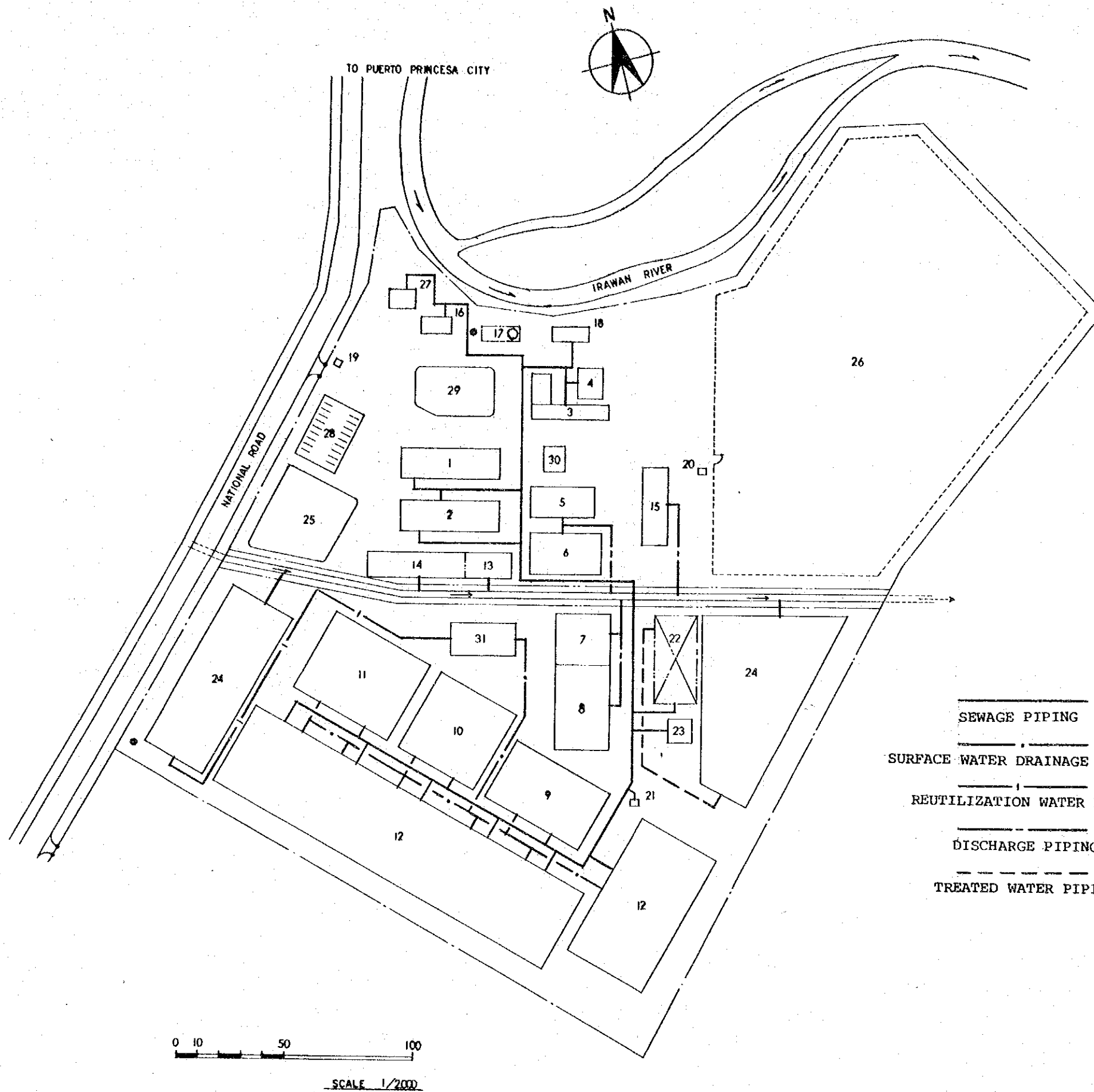


INSTRUCTIONS

1. ADMINISTRATION AND TRAINING BUILDING
2. LABORATORY BUILDING
3. MAINTENANCE BUILDING AND GARAGE
4. FEED HOUSE
5. HATCHLING HOUSE - A
6. HATCHLING HOUSE - B
7. REARING TANK - I (for 60 - 105 cm crocodiles)
8. REARING TANK - II (for 105 - 150 cm crocodiles)
9. EXPERIMENTAL REARING PEN
10. REARING PEN - I (for 3 - 6 year crocodiles)
11. REARING PEN - II (for 7 - 9 year crocodiles)
12. BREEDING PEN
13. EXPERIMENTAL REARING TANK
14. TANKS FOR SICK AND INJURED CROCODILES (ISOLATION TANKS)
15. PENS FOR NEWLY ARRIVED CROCODILES (DISINFECTION PENS)
16. JAPANESE EXPERTS' HOUSE
17. RESERVOIR TANK AND ELEVATED TANK
18. MACHINE HOUSE
19. GATE HOUSE
20. OBSERVATION HOUSE - I
21. OBSERVATION HOUSE - II
22. SEWAGE TREATMENT SYSTEM
23. INCINERATOR HOUSE
24. FEED BREEDING POND
25. SPACE FOR DEMONSTRATION PEN (FUTURE CONSTRUCTION)
26. NATURAL OBSERVATION PEN
27. DORMITORY FOR PROMOTERS UNDER TRAINING
28. PARKING LOT
29. STORAGE POND FOR REARING TANK & PEN
30. STORAGE POND FOR NURSERY TANK
31. STORAGE POND OF REUTILIZATION WATER

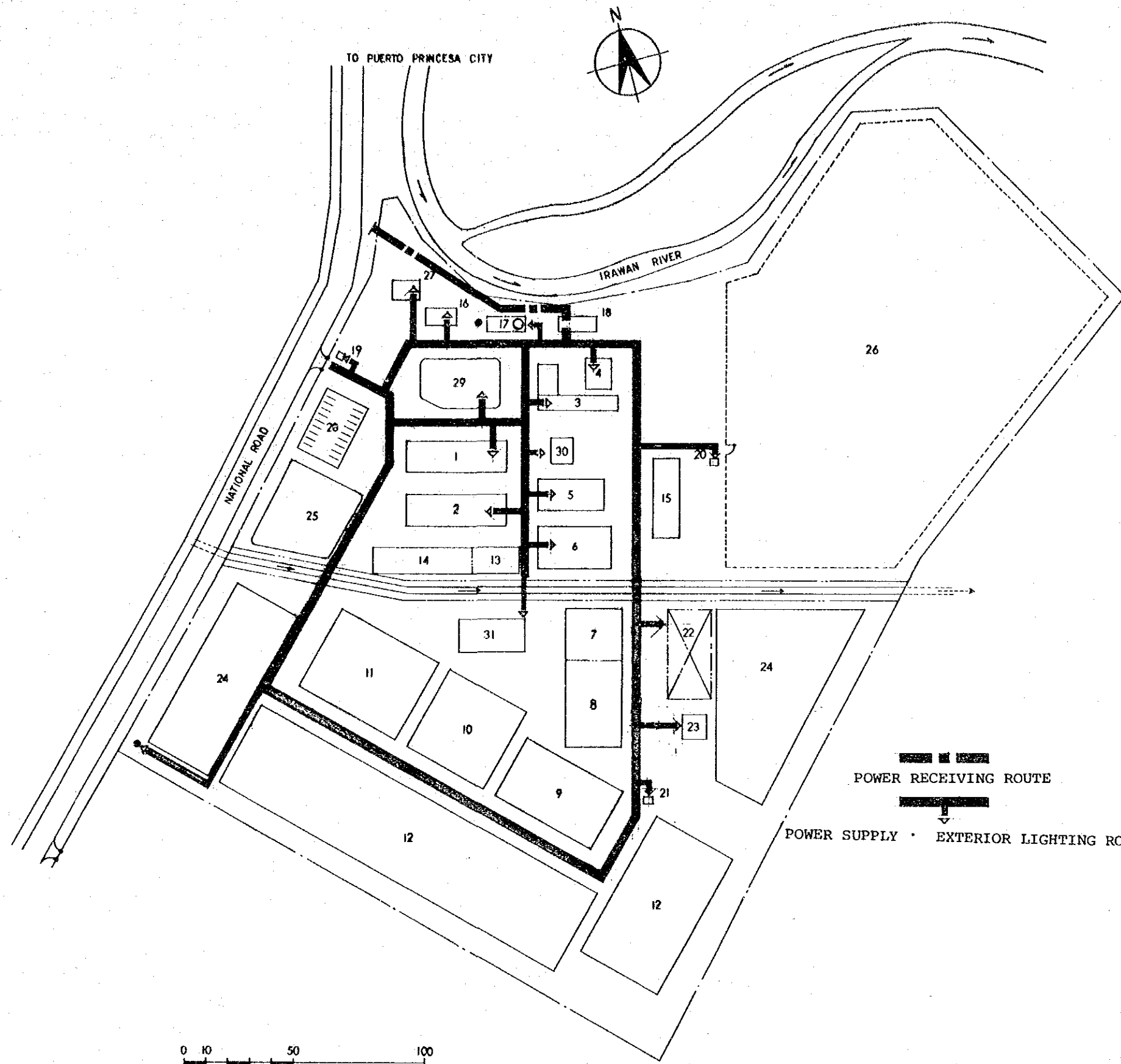
——— | ———
 WELL WATER PIPING
 ——— • ———
 POTABLE WATER PIPING
 ——— x ———
 WATER SUPPLY PIPING FOR CROCODILES

0 10 50 100
 SCALE 1/2000



INSTRUCTIONS

1. ADMINISTRATION AND TRAINING BUILDING
2. LABORATORY BUILDING
3. MAINTENANCE BUILDING AND GARAGE
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11. REARING PEN - II (for 7 - 9 year crocodiles)
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13. EXPERIMENTAL REARING TANK
14. TANKS FOR SICK AND INJURED CROCODILES (ISOLATION TANKS)
15. PENS FOR NEWLY ARRIVED CROCODILES (DISINFECTION PENS)
16. JAPANESE EXPERTS' HOUSE
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18. MACHINE HOUSE
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20. OBSERVATION HOUSE - I
21. OBSERVATION HOUSE - II
22. SEWAGE TREATMENT SYSTEM
23. INCINERATOR HOUSE
24. FEED BREEDING POND
25. SPACE FOR DEMONSTRATION PEN (FUTURE CONSTRUCTION)
26. NATURAL OBSERVATION PEN
27. DORMITORY FOR PROMOTERS UNDER TRAINING
28. PARKING LOT
29. STORAGE POND FOR REARING TANK & PEN
30. STORAGE POND FOR NURSERY TANK
31. STORAGE POND OF REUTILIZATION WATER



INSTRUCTIONS

1. ADMINISTRATION AND TRAINING BUILDING
2. LABORATORY BUILDING
3. MAINTENANCE BUILDING AND GARAGE
4. FEED HOUSE
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16. JAPANESE EXPERTS' HOUSE
17. RESERVOIR TANK AND ELEVATED TANK
18. MACHINE HOUSE
19. GATE HOUSE
20. OBSERVATION HOUSE - I
21. OBSERVATION HOUSE - II
22. SEWAGE TREATMENT SYSTEM
23. INCINERATOR HOUSE
24. FEED BREEDING POND
25. SPACE FOR DEMONSTRATION PEN (FUTURE CONSTRUCTION)
26. NATURAL OBSERVATION PEN
27. DORMITORY FOR PROMOTERS UNDER TRAINING
28. PARKING LOT
29. STORAGE POND FOR REARING TANK & PEN
30. STORAGE POND FOR NURSERY TANK
31. STORAGE POND OF REUTILIZATION WATER

0 10 50 100
SCALE 1/2000

CHAPTER 7. TECHNICAL COOPERATION

CHAPTER 7 TECHNICAL COOPERATION

The government of Japan will implement technical cooperation for the project from the initial stage in order to initiate the activities of the Institute smoothly, so that the Institute may accomplish its roles and purposes as mentioned in Chapter 4 "PROJECT" in the future.

Technical cooperation will be concerned with all the activities of the Institute: ecology of resources, physiology, veterinary, nutrology, thremmatology, farming technology, administration and management, etc. Technical cooperation will be implemented by sending Japanese experts to the Institute and by accepting Philippine researchers in Japan for training. In principle, the Institute will be operated under the leadership of the Philippine side. Japanese technical cooperation will be within the scope of Record and Discussions (R/D) in which specific subjects of cooperation will be agreed on by both governments. Since Japanese experts who specialize in ecological, physiological, pathological, and farming studies concerning crocodiles are extremely rare, the technical cooperation in academic fields will be mainly concerned to mediate between general studies and high level specific studies of crocodiles.

The specific nature of the technical cooperation, schedule, implementation, etc. will be determined by six months before the inauguration of the Institute between the government of the Philippines and the Japanese Technical Cooperation Implementation Survey Team. Therefore, this section contains only tentative suggestions on cooperation.

	COMPLETION OF THE INSTITUTE					
	0	1	2	3	4	5
Dispatch of Implementation Mission	R/D					
Dispatch of Japanese Experts Long Term Experts Short Term Experts	 (if necessary) 					
Discussion of Plan during T. Cooperation and Dispatch of Evaluation Team	□□	□□	□□	□□	□□	
Receiving Counterpart's Members (receiving Trainees)	□□□	□□□		□□□		
Supply of Equipment & Material		□□	□□	□□	□□	□□

TENTATIVE TECHNICAL COOPERATION SCHEDULE

CHAPTER 8 . IMPLEMENTATION OF THE PROJECT

CHAPTER 8 IMPLEMENTATION OF THE PROJECT

8-1 Executing Body

(1) Executing Agency and Organization

The executing agency for the implementation of the project is the Ministry of Natural Resources (MNR) through the Bureau of Forest Development (BFD). The proprietary right to the land of the proposed site, which is owned by NACIAD shall be transferred to BFD before the ground preparation by the Philippine side. Hence, BFD of MNR implements all the work related to the project, i.e., planning, implementation and management of the Institute.

The Institute will be organized to consist of 2 departments and 3 divisions under an institute director and institute assistant director, as shown in Fig. 8.1.

(2) Required Personnel

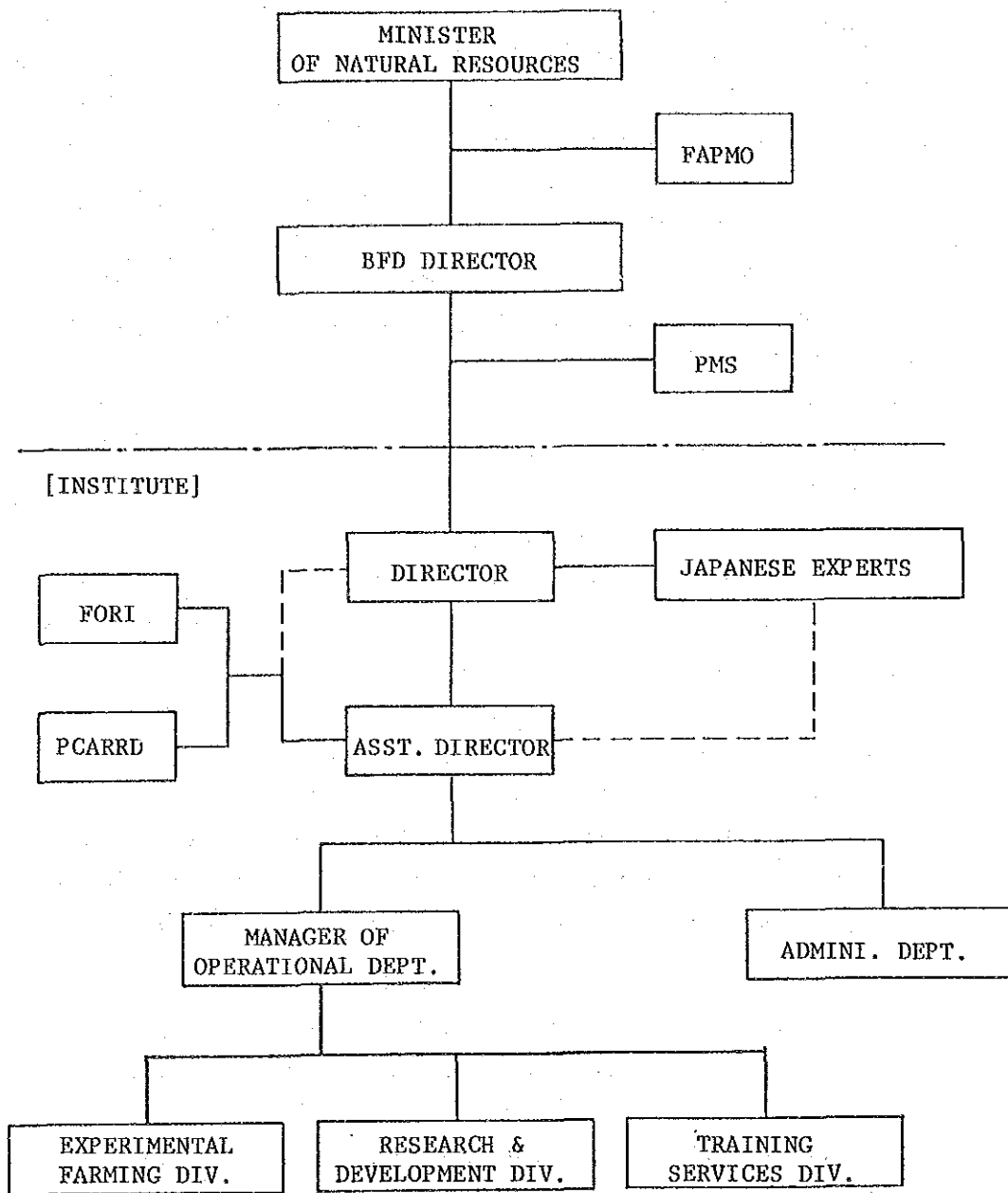
The plan for required personnel as modified from the one proposed by the government of the Philippines is shown in Table 8.1. Capabilities and scope of work required for the personnel are explained in the final stage as shown below.

① Institute Director, Asst. Director and Secretary

- The institute director is expected to be assigned from personnel who are at the same level as assistant director of BFD.
- Asst. director of the Institute will be responsible for practical operation and management of the Institute. He will also serve concurrently as a manager of the Administration Department.
- One secretary will serve both the director and asst. director.

② Administration Department

- The manager of the Administration Department will serve concurrently as the asst. director of the Institute.



PCARRD: PHILIPPINE COUNCIL FOR AGRICULTURE
AND RESOURCES RESEARCH AND DEVELOPMENT
FORI : FOREST RESEARCH INSTITUTE
FAPMO : FOREIGN-ASSISTED PROJECTS MANAGEMENT
OFFICE
PMS : PROJECT MANAGEMENT STAFF

FIG. 8.1 ORGANIZATION CHART

TABLE 8.1 PLAN OF REQUIRED PERSONNEL

	Initial stage	Final stage
Institute Director	1	1
Asst. Director	1	1
Secretary	1	1
<hr/>		
Manager of Administration Department	Concurrent service by Asst. Director	Same
Accountant *	1	1
Clerk	1	2
Safety/Maintenance Engineer	1	1
Electrician	1	1
Mechanic	1	1
Driver	3	3
Guard	4	6
Cook and helper	1	2
Utility man	2	4
<hr/>		
Manager of Operational Department	1	1
Trainer and Asst. Trainer	2	2
Researcher	4	4
Asst. Researcher	4	4
Chief Caretaker	1	1
Caretaker	3	11
<hr/>		
T O T A L	33	47

Remarks * Additional personnel which were not proposed in the initial proposal of the government of the Philippines.

- One accountant shall support the asst. director and be responsible for all financial arrangements of the Institute
- Two clerks will assist the accountant. One is for accounting work and the other for general affairs.
- One safety and maintenance engineer is required.
- One electrician and one mechanic are required. One cook and one helper are also required.
- Three drivers are required for following work:
 - 1) Driving for the director and asst. director
 - 2) Driving for Japanese experts
 - 3) Transportation of feed and other various kinds of requested materials for the operation of the Institute

These drivers will work under a working rotation which is adjusted according to the working load. In addition, they shall serve visitors and researchers on field surveys.

- Six security guards will form three shifts. Two guards are on the day shift, another two guards are on night time, and the last two are off.
- The duties of the four utility men shall be distinguished from those of caretakers. They are to be engaged in the following work.
 - 1) Cleaning of Administration Bldg., Laboratories and other buildings except the facilities for farming operations
 - 2) Cleaning of the Site (cleaning of the road, grass cutting, etc.)
 - 3) Shopping, distribution of letters, etc.

③ Operational Department

- The manager of the Operational Department is responsible for the operation of three operational divisions and coordinates not only among them but also between his department and the Administration Department.

a. Research and Development Divisions

- Researchers and asst. researchers are assigned as follows:

	<u>Researcher</u>	<u>Asst. Researcher</u>
1) Resource Management and Ecology Lab.	1	1
2) Physiology and Pathology Lab.	1	1
3) Crocodile Farming Lab.	1	1
4) Nutritional Chemistry Lab.	1	1
<hr/>		
T O T A L	4	4

b. Experimental Farming Division

- This division requires 12 personnel headed by a chief caretaker.

- The chief caretaker is one of the most important key persons for the operation of the Institute and shall work closely with the manager of the Operational Department. He shall control all kinds of farming activities and experimental work and give daily instructions to caretakers.

His main duties are to supervise and implement the following work.

- 1) Control of feed (scheduling purchases, storage and preparation of feed)
- 2) Control of feeding (feeding schedule, feeding time and handling of leftover feed, etc.)
- 3) Control of pen rotation
- 4) Control of pen environment
- 5) Handling of crocodiles
- 6) Preparation of work schedules and reports
- 7) Keeping of rearing data, reference, etc.

- Eleven caretakers are required for the following work:

1) Feed preparation	1
2) Nursery farming	4
3) Rearing and breeding	6

T O T A L 11

Their main work items are as follows:

- 1) Daily preparation of feed, feeding, cleaning and changing water of pens and tanks based on the work schedule
- 2) Seasonal work such as preparation of nest making, transfer of eggs to incubator, taking care of crocodiles
- 3) Report work results and health condition of the crocodiles to the chief technician

c. Training Services Division

- 1) Trainer arranges the schedules of training and coordinates among related divisions, and also gives lectures on the financial management of crocodile farming.
- 2) Asst. trainer assists the trainer and also gives lectures on fundamental knowledge of biological and technical matters necessary for crocodile farming.
- 3) They study the optimum management system of crocodile farming as well as actual training.

(3) Management Plan

① Schedule of stock production

Time from mating of breeders to egg-laying, hatching and growing up to breeding stock size are shown in Table 8.2, and rearing conditions of 0-year-old crocodiles are indicated in Fig. 8.2. It is recommendable to start breeding stock supply for private farmers using 6-month-old crocodiles in stable physical condition after successful initial feeding.

0-year-old crocodiles, from hatching to 1 year old, are reared mainly in FRP tanks. The FRP tank has many advantages for rearing baby crocodiles, i.e., no harm from the smooth surfaces, no necessity to fix lay-out of tanks in hatchling house and ease of transport according to the growth of crocodiles with light weight and strong materials.

TABLE 8.2 SCHEDULE OF BREEDING STOCK PRODUCTION

	Days from mating	Days from hatching	Remarks
Mating	0		
Nesting	23		
Egg-laying	25		(Egg size 5 x 8 cm Egg weight 110 g)
Hatching	110	0	(T.L. 20 - 30 cm B.W. 70 g)
Initial feeding	120	10	
6 month stock	295	185	(T.L. 50 cm B.W. 400 g)
1 year stock	475	365	(T.L. 80 cm B.W. 1800 g)

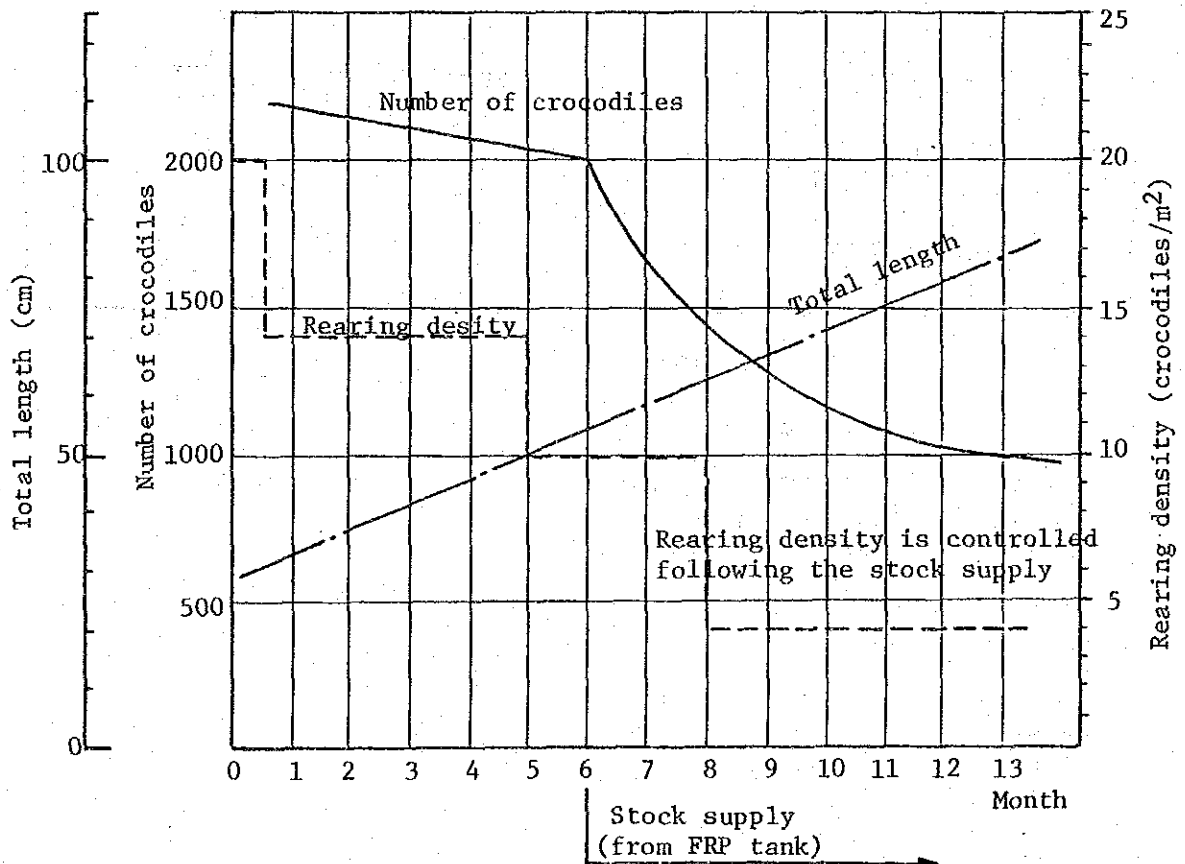
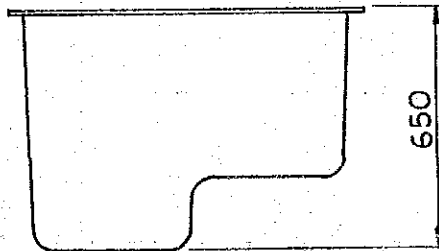
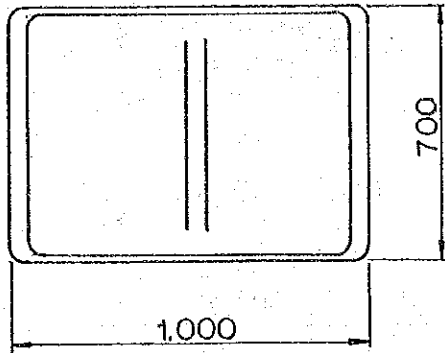
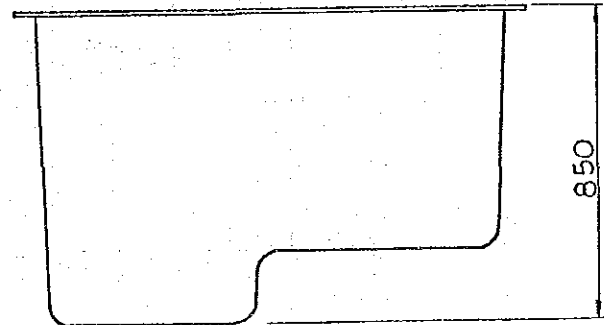
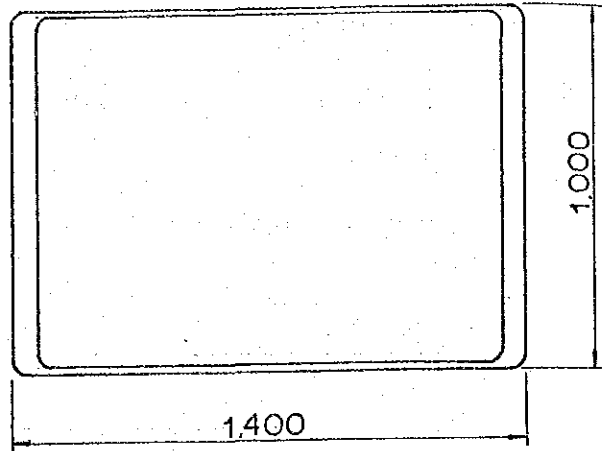


FIG. 8.2 REARING CONDITIONS OF 0-YEAR-OLD CROCODILES

The type of FRP tanks shall be determined by the growth stage of the crocodiles, with reference to rearing experiments. Samples of FRP tanks are described below.



Total area : 0.7 m^2
Inside area: 0.5 m^2



Total area : 1.4 m^2
Inside area: 1.0 m^2

② Rotation of rearing pens

Hatchlings are transported to bigger rearing pens in proportion to their growth. Rotation of rearing pens in the Institute is shown in Table 8.3.

TABLE 8.3 ROTATION OF REARING PENS

Stage	Age and Total Length	Number of Crocodiles	Rotation of* Rearing Pens	Remarks
I	Hatching - 2 weeks (30 - 35 cm)	2,500	Hatchling house - A	Reduction in number is due to natural mortality and death by experiment
II	2 weeks - 10 months (35 - 50 cm)	2,200	Hatchling house - B	Reduction in number is mainly due to supply of stock
III	10-13 months (50 - 60 cm)	1,000	Rearing tank for total length of 60 - 105 cm	Crocodile farming will be carried out during these stages in private farms
IV	13-18 months (60 - 75 cm)			
V	18-25 months (75 - 105 cm)			
VI	25 months - 3 years (105 - 150 cm)	900	Rearing tank for total length of 105 - 150 cm	
VII	3 - 6 years	120 in total	Rearing pen for 3-6 year crocodiles	30 crocodiles are kept annually for further rearing and the others are sold.
VIII	7 - 9 years	90 in total	Rearing pen for 7-9 year crocodiles	Observation of crocodiles and preparation of egg-laying stalls are required because even crocodiles under 10 years old may be matured.
IX	Over 10 years	200 in total	Breeding pen	

Remarks * Other pens i.e., Experimental pens and tanks, Observation pen, etc. are also utilized when required occasionally.

③ Plan of operations

The annual plan of operations is shown in Fig. 8.3 based on the schedule of stock production and rotation of rearing pens.

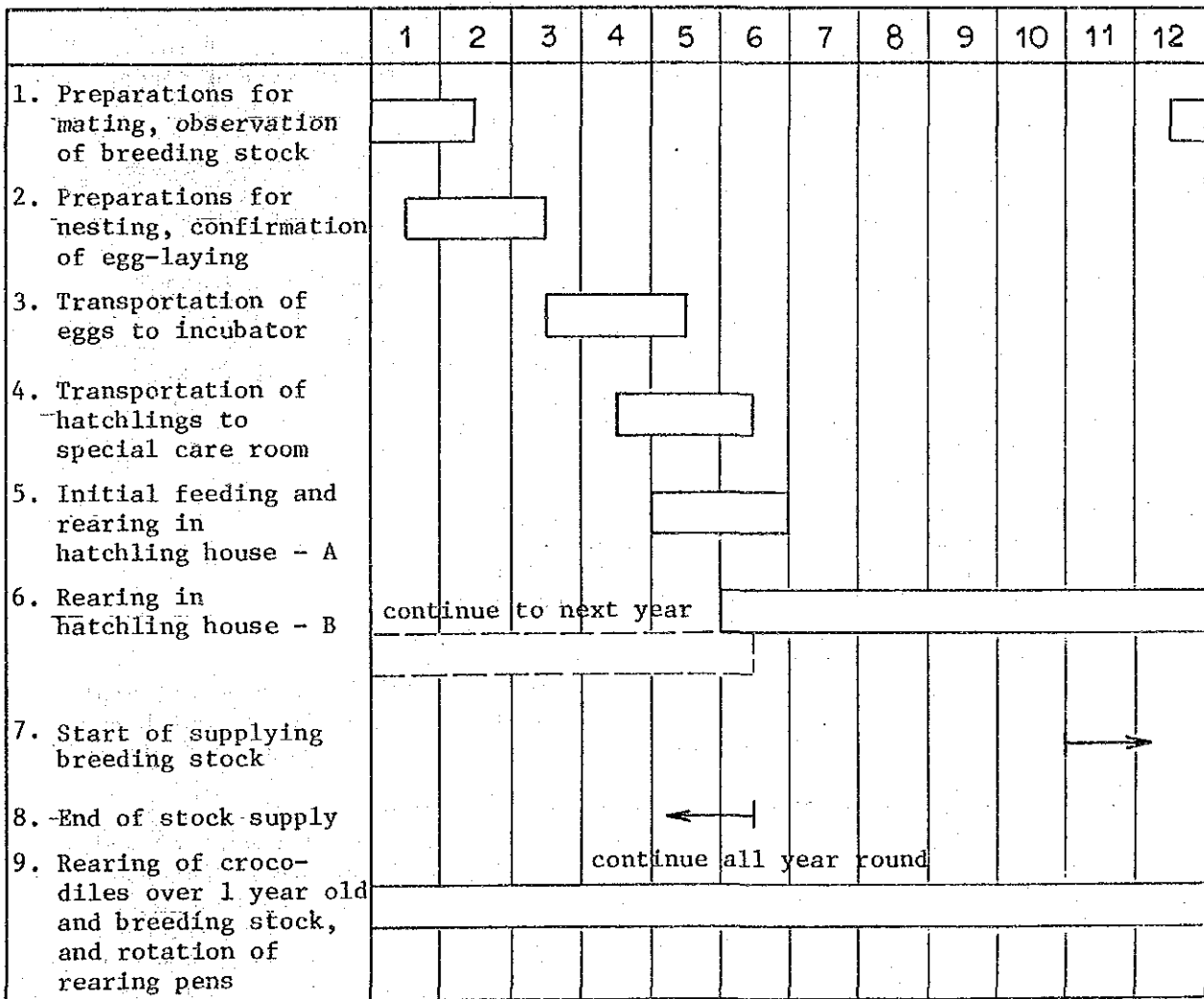


FIG. 8.3 ANNUAL OPERATION PLAN

④ Procurement of feed

The problems of feed supply and nutrition can be solved when a suitable compound feed is developed, but at present it is necessary to ensure fish and by-products from livestock.

Feed must contain high protein, be fresh and suit the preference of crocodiles. It is also desired that various kinds of feed be especially on Palawan, livestock such as chickens, pigs, etc. and their by-products are rather expensive. Thus, fish will be mainly used as feed material.

The area surrounding Palawan is well-known as a good fishing ground; especially around the northern islands commercial fishery is carried out in a large scale. Many of the commercial fishing vessels unload fish directly or by using fish carrier to Manila which is the biggest fish consumption center. On the other hand, some of commercial fishing vessels and many of municipal fishing craft unload fish in Puerto Princesa City or municipalities such as Roxas and Narra, which are respectively located 110 km north-east and 85 km south-west of Puerto Princesa. Annual fish production in Palawan reaches about 70,000 tons, which is thought to be enough for local consumption even though a part of production is transported to Manila.

However, it is rather difficult to get all of the feed required in the Institute at one fish port, an amount of about 600 kg per day as shown in Table 4.3 of Chapter 4, because fisheries operating around Puerto Princesa City are mainly small-scale and landings per place per day are estimated at some 100s kg. Therefore, the question of how to purchase a constant volume of fish at low cost regularly from a major fishing port such as Narra or Roxas under contract with the local fishermen will be studied. When the roads between these municipalities and Puerto Princesa are paved as planned in 1985, it will take only 3 - 5 hours to and fro. it is possible to procure a stable amount of feed using the middle-size refrigerator car and cold storage installed in the Institute.

The fish suitable for feed are roundscades, mackerels, frigate tunas, etc.

⑤ Water exchange

Water exchange in the rearing tanks and pens is very important in order to avoid water pollution caused by the remains of feed or excrement and to keep the crocodiles healthy. It is recommended to exchange all the water at once together with the cleaning of the pond. The frequency of water exchange is determined by the existing information on rearing and farming as follows:

- 1) FRP tanks in the Hatchling Houses ————— Every day
 - 2) Isolation tank for sick crocodiles ————— Twice a week
 - 3) Rearing pens for 1 - 6 years crocodiles —————
 - 4) Experimental pen —————
 - 5) Disinfection pen —————
 - 6) Rearing pens for 7 - 9 years crocodiles —————
 - 7) Breeding pens —————
- Once a week
- Once a month

Water exchange shall be effectively carried out with other routine work. Fig. 8.4 shows the water exchange plan where all rearing facilities are in full operation.

TABLE 3.4 PLAN OF WATER EXCHANGE OF THE REARING TANKS AND PENS (1/2)

Type of tank and pen	Volume of water (m ³)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
		Mon.	Tue.	Wed.	Tur.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Tur.	Fri.	Sat.	Sun.	Mon.	Tue.	Wed.	Tur.	Fri.	Sat.	Sun.	Mon.
FRP tanks for 0 year crocodile	4.75 or 15.1	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Isolation tank for sick crocodile	45	○				○			○				○			○				○			○
Rearing tanks for 1 year crocodile	31.1		○								○								○				
Rearing tanks for 2 year crocodile	101.2			○						○								○					
Rearing tanks for 3 - 6 year crocodile	241.2		○						○								○						
Experimental pen	144.4		○						○								○						
Disinfection pen	72				○						○								○				
Rearing Pens for 7 - 9 year crocodile	360			○																			
Breeding pens	473								○														
	394									○													
	495		○																				
	464					○																	
	464															○							
	464																	○					
	464																		○				
	464																						○
	464																						○
Volume of Water Exchange per day l)	555, 400, 476, 118, 524, 15.1	555, 400, 476, 118, 524, 15.1	400, 476, 118, 524, 15.1	476, 118, 524, 15.1	118, 524, 15.1	524, 15.1	15.1	15.1	533, 400, 476, 118, 524, 15.1	400, 510, 580, 400, 524, 15.1	510, 580, 400, 524, 15.1	118, 580, 400, 524, 15.1	60.1, 118, 580, 400, 524, 15.1	15.1, 118, 580, 400, 524, 15.1	15.1, 118, 580, 400, 524, 15.1	524, 15.1	400, 580, 400, 524, 15.1	580, 400, 524, 15.1	118, 524, 15.1	524, 15.1	15.1, 15.1	15.1, 524, 15.1	524, 15.1

Remarks 1): 8,104.2 tons of water is required for water exchange per month

(2/2)

Type of tank and pen	Volume of water (m ³)	23	24	25	26	27	28	29	30
		Tue.	Wed.	Tur.	Fri.	Sat.	Sun.	Mon.	Tue.
FRP tanks for 0 year crocodile	4.75 or 15.1	○	○	○	○	○	○	○	○
Isolation tank for sick crocodile	45				○			○	
Rearing tanks for 1 year crocodile	31.1			○					
Rearing tanks for 2 year crocodile	101.2		○						
Rearing tanks for 3 - 6 year crocodile	241.2	○							○
Experimental pen	144.4	○							○
Disinfection pen	72			○					
Rearing Pens for 7 - 9 year crocodile	360								
Breeding pens	473								
	394								
	495							○	
	464								
	464								
	464								
	464								
	464								
	464		○						
Volume of Water Exchange per day		400 ₇	580 ₃	118 ₂	60.1	15.1	15.1	555 ₁	400 ₇

8-2 Construction Planning

(1) Construction Planning

Before the construction of the institute facilities, obstructing trees and existing buildings will be removed, and the levelling of the ground will be completed by the Philippine side. As for the construction procedure, it is appropriate to plan that most of the earth work and concrete work will be done during the dry season.

As the civil work is one of the major portions of the work, some civil engineers need to be appointed in addition to the ordinary supervisory staff of the Contractor; building engineers, mechanical engineers, electrical engineers and clerical staff.

Even after the commencement of the construction, a continuous exchange of opinion will be necessary between the Japanese side and the Philippine side on the work schedule and construction techniques for better implementation. As the work progresses, reliable supporting systems shall be established in Japan.

(2) Supervisory Planning

The Consultant is responsible for endeavouring to see that the construction work conforms to the specifications of the contract and the expectations of both governments, and to fulfill supervisory services in the neutral position and exercise judgement as the technical representative of the Client. During the work, a field manager of the Consultant will be dispatched, and whenever necessary, architects, and structural, civil, mechanical, and electrical engineers will inspect and provide instructions at the Site.

8-3 Scope of the Responsibilities

(1) Japanese Responsibilities

- 1) To construct buildings and other facilities
- 2) To provide utilities for the above buildings and facilities
- 3) To provide and install machinery and equipment

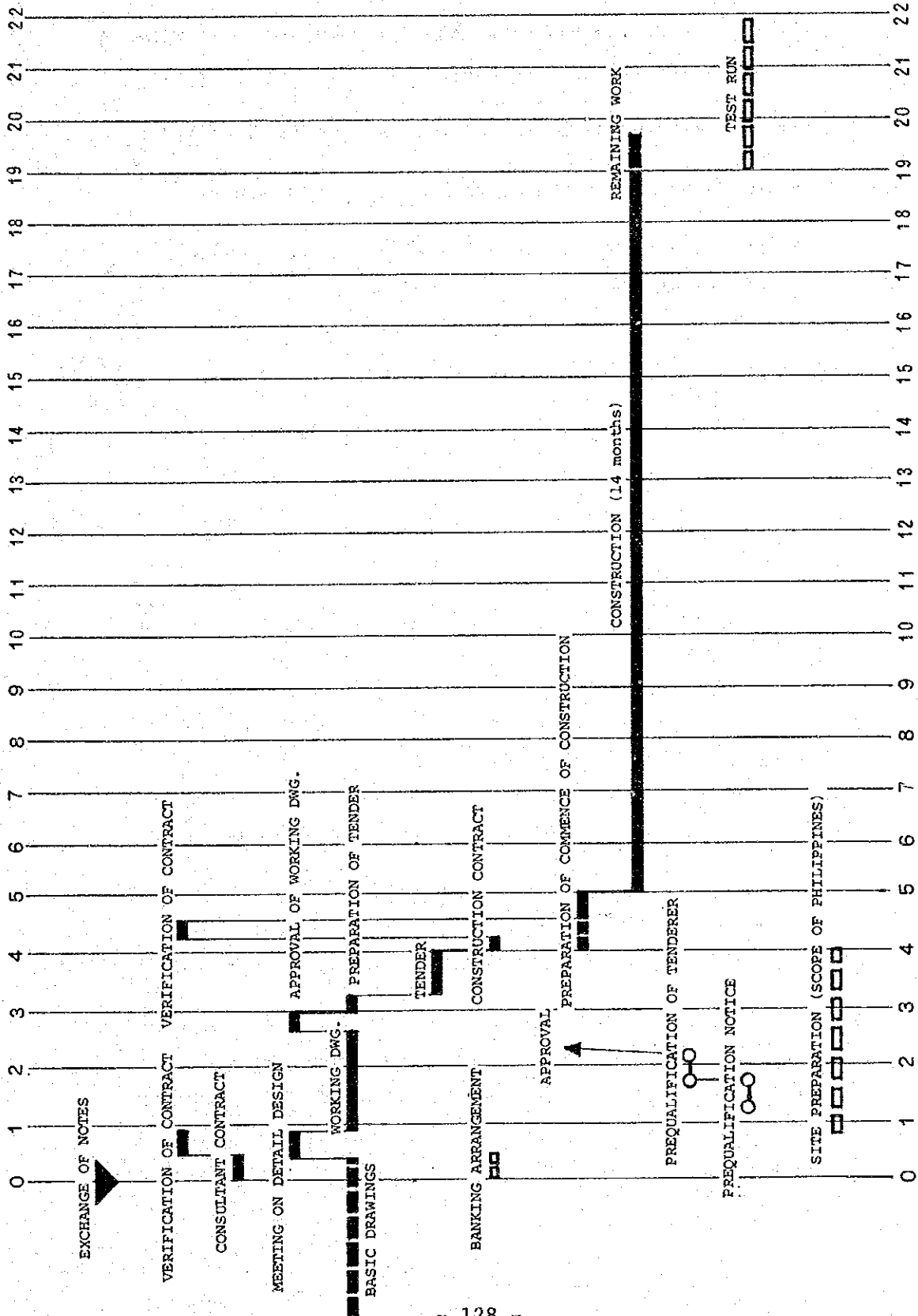
(2) Philippine Responsibilities

- 1) To secure land necessary for the project and to clear and level the Project Site as needed before the start of construction
- 2) To construct and prepare the access road to the Project Site
- 3) To provide facilities for the distribution of electricity and external drainage from the Project Site
- 4) To provide furniture, carpets, curtains and other furnishings
- 5) To cover maintenance, management and operational costs of the Institute
- 6) To ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in the Philippines and prompt internal transportation therein on the products and equipment purchased under the grant
- 7) To exempt Japanese nationals engaged in the project from customs duties, internal taxes and other fiscal levies which may be imposed in the Philippines
- 8) To accord without delay the Japanese nationals whose services may be required in connection with the supply of the products and equipment and services under the verified contracts such facilities as may be necessary for entry into the Philippines and their stay therein for the performance of their work

- 9) To bear all the expenses, other than those to be borne by the grant, necessary for the construction of the facilities
- 10) To undertake incidental work such as planting and gates
- 11) To provide the space necessary for such construction as temporary offices, working area, stock yards, etc.
- 12) To apply for permission for construction, facilities, etc.
- 13) To undertake revetment work along the Irawan River
- 14) To procure 200 parent crocodiles for the opening stage of the Institute

8.4 Tentative Construction Schedule

The tentative construction schedule starting on the day of signing on the Exchange of Notes is as follows:



8.5 Management Planning

(1) Planning

This Institute will belong to BFD under MNR. A director appointed by BFD and the staff under the director will undertake the administration and management of the Institute. Consequently, budget for the administration and management of the Institute will be appropriated within the fiscal budget of BFD.

In planning the facilities of the Institute, stress will be laid on the "maintenance-free" concept, and in selection of the equipment, ease of handling and maintenance will be emphasized as the important criteria.

A safety and maintenance engineer, an electrician and a mechanic assigned to the Institute, will receive instructions on methods of handling, maintaining and repairing equipment and facilities, before the completion of the work so that they may be fully accustomed to routine inspection and repairs.

(2) Cost Estimation

The approximate annual running costs of the Institute are estimated as follows:

Note: This cost estimation is based on unit price data as of December, 1984

1) Personnel expenses	922,000 ₱/year
2) Maintenance and repairs	225,000
3) Power and water supply	1,819,000
4) Crocodile feed	1,760,000
5) Training, promotion and other activities	120,000

T O T A L

4,846,000 ₱/year

The past fiscal budgets appropriated to BFD are shown in the following table.

(in 1000 pesos)

Fiscal year	1980	1981	1982	1983	1984	1985
Appropriated budget	341,861	452,722	522,370	538,398	431,927	419,043

As the figure shows, the annual running cost required for the Institute will amount to 1.16% of the 1985 BFD budget.

- Notes: 1) Approximate costs estimated herein are those for when the Institute is in full operation. Expenses for personnel, crocodile feed and electricity costs are expected to be lower in the first few years.
- 2) Once the Institute is operating smoothly, income can be expected from selling crocodiles for farming, and feed expenses may be decreased by producing feed in the Institute.

(3) Calculation Method (one pesos = 12.6 yen)

① Personnel expenses

Personnel expenses including bonuses for the institute staff are estimated as follows:

	Monthly wage (peso)	Person	Annual wage (1000 ₱)
Director	3,500*	1	42.0
Asst. director	3,000*	1	36.0
Secretary	1,625	1	19.5
Accountant	2,500	1	30.0
Clerks	1,410	2	33.84
Safety/Maintenance engineer	1,600	1	19.2
Electrician	1,410	1	16.92
Mechanic	1,410	1	16.92
Drivers	1,300	3	46.8
Guards	1,300	6	93.6
Cook	1,410	1	16.92
Helper	1,300	1	15.6
Utility men	1,300	4	62.4
Manager	2,700*	1	32.4
Researchers	2,500*	4	120.0
Asst. researchers	1,600*	4	76.8
Chief caretaker	1,820	1	21.84
Caretakers	1,300	11	171.6
Trainer	2,500*	1	30.0
Asst. trainer	1,600	1	19.2
T O T A L		47	921.54 ↓ 922

Note * assumed wage ; monthly wage may vary depending on age and experience, etc.

② Maintenance and repair costs 225,000 ¥/year

- 1) Maintenance and repairs of buildings,
0.1% of assumed direct work cost: 1,000,000 yen
- 2) Maintenance and repairs of equipment,
0.5% of assumed purchase cost: 825,000
- 3) Maintenance of water treatment
system (including chemicals): 1,000,000

T O T A L 2,825,000 yen

Consequently $2,825,000 \div 12.6 = 224,206 \approx 225,000$ ¥/year

③ Power and water supply costs

No water service charge is required because well water is used in the Institute. The water supply cost is included in the cost of electricity to run the well water lift pump.

a. Electricity charges 1,355,000 ¥/year

- equipment fee : Required capacity of the Institute:
about 499 kw

Contract capacity will be determined according to usage conditions, and for now, assume 90% of the capacity is consumed simultaneously.

$$499 \times 0.7 \approx 350 \text{ kw}$$

Equipment fee : 20 ¥/kw (Table 3.5)

This is excluded from the estimation because it is needed at the time of application only.

(cf. at the time of application)

$$350 \text{ kw} \times 20 \text{ ¥} = 7,000 \text{ ¥}$$

- service charge : The standard method is to set the electric capacity of all the machines and equipment run by electricity. Calculate annual consumption for each category according to the daily operated hours and frequency of use. For service charge, multiply 3.88 ¥/kWh to the sum of consumption for each category. (Table 3.5)

The following are trial calculations for each category.

- 1) (lighting fixtures) + (receptacle outlets) 97,667 kwh/yr
 Buildings: $163\text{kw} \times 7\text{h} \times 0.3 \times 22\text{dy} \times 12\text{mon}$ = 90,367
 Exterior lighting: $2\text{kw} \times 10\text{h} \times 365\text{dy}$ = 7,300

- 2) Lab. equipment in laboratories 38,592 kwh/yr
 Refrigerators: $15\text{kw} \times 24\text{h} \times 0.2 \times 360\text{dy}$ = 25,920
 Others : $30\text{kw} \times 8\text{h} \times 0.2 \times 22\text{dy} \times 12\text{mon}$ = 12,672

- 3) Air conditioning system 32,103 kwh/yr
 Pump, cooling tower:
 $3.45\text{kw} \times 8\text{h} \times 22\text{dy} \times 12\text{mon}$ = 7,287
 Air con.: $23.5\text{kw} \times 8\text{h} \times 0.5 \times 22\text{dy} \times 12\text{mon}$ = 24,816

- 4) Water supply plant system 63,759 kwh/yr
 Daily water consumption at the Institute is approx. 600 m^3
 on weekdays. Assuming 2 well pumps lift up 300 m^3 per day,
 design capacity hours operated
 $5.5 \text{ kw} \times 300\text{m}^3/40\text{m}^3/\text{h} \times 22\text{dy} \times 12\text{mon}$ = 10,890
 $15 \text{ kw} \times 300 / 40 \times 22\text{dy} \times 12\text{mon}$ = 29,700
 Others: $45.38\text{kw} \times 2\text{h} \times 22\text{dy} \times 12\text{mon}$ = 23,169

- 5) Hot water supply system 2,112 kwh/yr
 Circulation pump: $2\text{kw} \times 4\text{h} \times 22\text{dy} \times 12\text{mon}$ = 2,112

- 6) Freezer & refrigerator for crocodile feed 45,271 kwh/yr
 Freezer: $48.2\text{kw} \times 3\text{h} \times 365/3 \text{ day}$ = 17,641
 Cooler : $4.75\text{kw} \times 6\text{h} \times 365\text{day}$ = 10,402
 Pump, cooling tower: $5.9\text{kw} \times 8\text{h} \times 365 \text{ dy}$ = 17,228

- 7) Infrared lamp in Hatchling House - A 3,240 kwh/yr
 Used only 3 months in a year for hatching of crocodile
 eggs in special care room. One month is taken as 30 days
 for calculation. (Used only when temp. drops at night)
 $18\text{kw} \times 2\text{hr} \times 30\text{dy} \times 3\text{mon}$ = 3,240

8) Incubator 24,103 kwh/yr
 Used only for incubating eggs.
 Assume to use for 110 days a year.
 Incubator: $9.13\text{kw} \times 24\text{h} \times 110\text{dy}$ $\approx 24,103$
 (415 w x 22 sets = 9.13 kw)

9) Sewage treatment system 25,842 kwh/yr
 Pump and other equipment:
 $5.9\text{kw} \times 16\text{h} \times 0.75 \times 365\text{dy}$ = 25,842

10) Incinerator 2,234 kwh/yr
 Assume to use 3 hours a day every 3 days
 design capacity
 $6.12\text{kw} \times 3\text{h} \times 365/3\text{day} = 2,233.8 \approx 2,234$

11) Food processer 1,716 kwh/yr
 $1.5\text{kw} \times 4\text{h} \times 22\text{day} \times 12\text{mon}$ = 1,716

12) Ventilation fan 12,672 kwh/yr
 $12\text{kw} \times 8\text{h} \times 0.5 \times 22\text{dy} \times 12\text{mon}$ = 12,672

Total cost of items 1) to 12) is:

$$349,311\text{ kwh/yr} \times 3.88\text{ ¥/kwh} = 1,355,327 \approx 1,355,000\text{ ¥/year}$$

b. Gas charge 97,000 ¥/year

LPG cost per kg is calculated according to Table 3.6.

$$720\text{ ¥} \div 50\text{ kg} = 14.4\text{ ¥/year}$$

Total annual consumption of LPG in the dining room, Laboratory Bldg., Japanese Experts' House and Dormitory is approx. 6,700 kg/year.

$$6,700\text{ kg/yr} \times 14.4\text{ ¥/kg} = 96,480 \approx 97,000\text{ ¥/year}$$

c. Fuel cost 367,000 P/year

Fuel cost shall be calculated by multiplying 8.9 P/l (for gasoline) or 7.35 P/l (for diesel oil) and 7.26 P/l (for kerosine) respectively to the assumed fuel consumption of vehicles, boat or facilities to be granted.

1) Vehicles:

Calculate fuel consumption based on distance covered per liter, by estimating distance given to each type of vehicle.

Gasoline cars 5,600 l/yr

2 cars: $1,000 \text{ km/mon} \times 2 \times 12 \text{ mon} \div 5 \text{ km/l} = 4,800 \text{ l/yr}$

Wheel loader

1 car: $100 \text{ hr/yr} \times 8 \text{ l/yr} = 800 \text{ l/yr}$

Diesel oil cars 2,400 l/yr

Small size truck (2 ton):

$500 \text{ km/mon} \times 12 \text{ mon} \div 5 \text{ km/l} = 1,200 \text{ l/yr}$

Refrigerator car (2 ton):

$500 \text{ km/mon} \times 12 \text{ mon} \div 5 \text{ km/l} = 1,200 \text{ l/yr}$

2) Boat (gasoline) 1,800 l/yr

gasoline: $10 \text{ hr/mon} \times 12 \text{ mon} \times 15 \text{ l/hr} = 1,800 \text{ l/yr}$

3) Incinerator; operated 3 hours a day every 3 days

kerosine: $17 \text{ l/hr} \times 365/3 \text{ dy} \times 3 \text{ hr} = 6,205 \text{ l/yr}$

4) Generator

Power failures in the site region are expected 60 hours a month on the average. The capacity of the emergency generator for the Institute is 300 KVA, however, it is assumed to be operated at 50% of the load.

diesel oil: $90 \text{ l/hr} \times 0.50 \times 60 \text{ h} \times 12 \text{ mon} = 32,400 \text{ l/yr}$

Consequently,

gasoline : $7,400 \text{ l/yr} \times 8.9 \text{ P/l} = 65,860 \text{ P/yr}$

diesel oil : $34,800 \times 7.35 = 255,780 \text{ P/yr}$

kerosine : $6,205 \times 7.26 = 45,048.3 = 45,048 \text{ P/yr}$

T O T A L

366,688 P/yr

(Electricity charges) + (Gas charge) + (Fuel cost)
= 1,819,000 ₱/year

④ Crocodile feed expenses

In sec. 4-2-(2)-2, amount of feed necessary for the Institute is estimated to be approx. 220 tons a year. Therefore,

$220,000 \text{ kg} \times 8 \text{ ₱/kg} = 1,760,000 \text{ ₱/year}$

⑤ Expenses for education, promotion and other services

Estimated to be 10,000 ₱/month for printing and drawing up of pamphlets, posters, textbooks, etc.

$10,000 \text{ ₱/month} \times 12 \text{ mon} = 120,000 \text{ ₱/year}$

8.6 Procurement

(1) Materials

Aggregates, sand, timber and concrete blocks are the only construction materials that are supplied more or less sufficiently in and around Puerto Princesa City. For the purpose of quality control and a stable supply of concrete blocks, it is necessary to select a certain manufacturer and purchase such quality-controlled concrete blocks directly from him. Sand and aggregates can be purchased from the local collectors, but aggregates shall be graded on the Site as they do not sieve aggregates by size.

Materials except for the above four will be shipped either from other places in the country or from overseas. Reinforcing bars, structural steel, part of finishing materials, and electrical and mechanical equipment are expected to be procured in Japan, because of the level of production technique, difference of the product standards and expensive unit price in the Philippines.

Thorough examination on procurement of materials and transportation system is needed to satisfy the above conditions.

(2) Construction Machinery

Only a few commercial rental companies of construction machinery are in business in Puerto Princesa now, and the volume of inventory and maintenance conditions are not favorable.

Therefore, it is recommended to procure the construction machinery either in the Manila area or from Japan depending on terms and charges of rental services. (There were two construction sites in Puerto Princesa City using construction machinery rented in Manila as of November 1984.)

(3) Labor

It does not seem possible to recruit a lot of engineers and skilled workers in Puerto Princesa City. The plan is to obtain these people from Manila. Common laborers can be recruited in the site region.

CHAPTER 9 . PROJECT EVALUATION

CHAPTER 9 PROJECT EVALUATION

The objectives of the project are to construct a crocodile farming institute for the purpose of research on the ecology of crocodiles inhabiting the Philippines which are now on the verge of extinction, and the development of their farming technology.

Two species of crocodile originally inhabiting the Philippines, the Mindoro crocodile (C. mindorensis) and saltwater crocodile (C. porosus), are to be conserved according to the Washington Convention. This project is aiming at the conservation and farming of these species.

Through the establishment and operation of this Institute, it is expected to establish policies on conservation of both crocodiles and to disseminate crocodile farming technique in order to prevent loss of habitat due to uncontrolled hunting and environmental destruction. This Institute will promote and disseminate crocodile farming techniques in cooperation with satellite stations located in several regions. Consequently it will contribute to the priority policies of the Philippine Five Year Development Plan and earn high evaluation as it aids the progress of the KKK Program.

CHAPTER 10 . CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS

10-1 Conclusions

As the preservation of wild fauna and flora has attracted worldwide concern, this project is aimed at actively engaging in the conservation of crocodiles inhabiting the Philippines which are now on the verge of extinction, and as a byproduct of the project, raising the standard of living of the people of the area.

Accomplishment of such an important project, by constructing facilities under Japanese grant aid, and by assisting and promoting its management and study activities by technical cooperation, is very significant as is mentioned in the foregoing chapters. Its purpose, method, situation, etc. can be said to be quite appropriate to the extension of cooperation from Japan.

10-2 Recommendations

The following recommendations are presented for the realization of the project.

As this Institute will be of a thoroughly new organization, it is suggested that the government of the Philippines promptly select and appoint administrative staff and researchers of the Institute, determine activities and management programs after the inauguration, and examine these programs in detail. It is also recommended that a number of trainees be gathered, and attention be paid not only to the study of crocodiles and crocodile farming but also to sufficient training and aftercare of the trainees because the Institute attains its ultimate objectives only when the results of the studies developed there are disseminated widely to the public.

Once the Institute starts operation, electricity costs to keep enough water and feed, vital for crocodile life, will make up a large percentage of the running costs. Therefore, efficient management planning and security of sufficient finance should be considered.

ANNEX

ANNEX

CONTENTS

	<u>Page No.</u>
1. BASIC DESIGN STUDY PHASE - I	1
(1) Minutes of Discussions	1
(2) Member List of the Study Team	4
(3) Schedule of the Study Team	5
(4) List of Personnel Interviewed in the Philippines	7
2. BASIC DESIGN STUDY PHASE - II	8
(1) Minutes of Discussions	8
(2) Member List of the Study Team	11
(3) Schedule of the Study Team	12
(4) List of Personnel Interviewed in the Philippines	14
3. FINAL REPORT DRAFT MISSION	17
(1) Minutes of Discussions	17
(2) Member List of the Draft Mission	19
(3) Schedule of the Draft Mission	20
(4) List of Personnel Interviewed in the Philippines	21
4. REPORT ON TRIAL WELL AND REPORT ON QUALITY ANALYSIS OF WELL WATER	22

I. BASIC DESIGN STUDY PHASE-I - I

(1) Minutes of Discussions

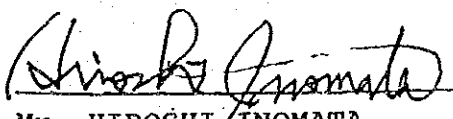
MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY
FOR
THE ESTABLISHMENT OF CROCODILE FARMING INSTITUTE
IN
THE REPUBLIC OF THE PHILIPPINES

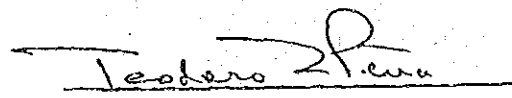
In response to a request made by the Government of the Republic of the Philippines for the establishment of the Crocodile Farming Institute (hereinafter referred to as "The Project"), the Government of Japan has dispatched through Japan International Cooperation Agency (JICA), a survey team headed by Mr. Hiroshi INOMATA, Second Economic Cooperation Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, to conduct the Basic Design Study (Phase I) from November 6, 1983 to the Republic of the Philippines.

The team carried out a field survey, held a series of discussions and exchanged views with the officials concerned of the Philippine Government (hereinafter referred to as "The Authorities Concerned") as to the Project.

As a result of the survey and discussions, both parties agreed to recommend to their respective governments to examine the results of the discussions attached herewith toward the realization of the Project.

November 22, 1983


Mr. HIROSHI INOMATA
Leader
Japanese Study Team


Hon. TEODORO Q. PEÑA
Minister
Ministry of Natural Resources

1. The objectives of the Japanese Grant Aid Programme is to provide necessary facilities and equipments for the construction of the Crocodile Farming Institute (hereinafter referred to as "the Institute").
2. The objectives of the Institute are:
 - 1) to formulate an effective and appropriate technology that will maximize the breeding capability of the selected crocodile species,
 - 2) to determine the effectiveness of raising and breeding crocodiles under controlled conditions so that the wild population can be protected and preserved from extinction,
 - 3) to develop the appropriate technology in effectively propagating the crocodile,
 - 4) to determine constraints, especially diseases and feeding problems, that will affect the well-being of the stock,
 - 5) to promote national awareness and appreciation of wildlife species found therein, and
 - 6) to formulate a programme which provide for the dissemination of the breeding technology to a larger number of beneficiaries.
3. The Executing Agency for the implementation of the Project is the Ministry of Natural Resources through the Bureau of Forest Development.
4. The proposed site of the Project is the land acquired by the Government of the Philippines (hereinafter referred to as "the Project Site"). The Project Site is shown in Annex I.
5. The Japanese Study Team will convey to the Government of



Japan the desire of the Philippine Government that the former takes necessary measures to cooperate by providing the facilities and equipments as listed in Annex II within the scope of Japanese economic cooperation in Grant Form.

6. The Authorities Concerned have understood and confirmed Japan's Grant Aid system explained by the team which includes a principle of use of a Japanese consultant firm and a Japanese general contractor for the construction of the Institute.
7. The Authorities Concerned have confirmed that the Philippine Government will take necessary measures as those listed in Annex III in the course of implementing the Project on condition that Japanese Grant Aid would be extended to the Project.

R

[Signature]

(2) Member List of the Study Team

Name	Speciality	Title
Mr. Hiroshi INOMATA	Leader (Grant Aid)	Deputy Director Second Economic Cooperation Div., Economic Cooperation Bureau Ministry of Foreign Affairs
Mr. Akira SAIKYO	Project adviser	All Japan Association of Reptic Skin and Leather Industries
Mr. Mikio NAKAMURA	Project coordinator	Basic Design Div. Grant Aid Dept. Japan International Cooperation Agency
Mr. Takeo ETOH	Architect	Yokogawa Architects & Engineers, Inc.
Mr. Michio YAMADA	Civil Engineer	Yokogawa Architects & Engineers, Inc.
Mr. Noboru HOSHINO	Architect	System Science Consultants, Inc.

(3) Schedule of the Study Team

Date	Activities
1. Nov 3 (Thu)	13:25 leave NARITA (JAL 465) 17:35 Bangkok Bangkok Palace Hotel
2. 4 (Fri)	a.m. Department of Fisheries, Min. of Agriculture & Cooperative, Thailand inspection of Samutprakan Crocodile Farm, fish market p.m. visit Japanese Embassy, JICA Bangkok Office
3. 5 (Sat)	a.m. investigation of Samutprakan Crocodile Farm p.m. meeting, data editing
4. 6 (Sun)	11:15 Bangkok to Manila 14:20 (AF 180) join B team and Mr. INOMATA (Team Leader) briefing session on Samutprakan Crocodile Farm
5. 7 (Mon)	visit Japanese Embassy, JICA Manila Office
6. 8 (Tue)	discussion at MNR PFDA request for information on fisheries
7. 9 (Wed)	8:35 Manila to Calapan 11:20 visit Office of Governor, National Irrigation Administration, Oriental Mindoro Electric Corporation team meeting
8. 10 (Thu)	survey at proposed site visit Frog Farming Center team meeting
9. 11 (Fri)	a.m. team meeting p.m. planimetry on ground suitable for site visit PFO, BAI, SEAFDEC, PAO, Poultry Farming Center
10. 12 (Sat)	9:30 Calapan to Manila 13:50 data editing on Mindoro
11. 13 (Sun)	10:00 Manila to Puerto Princesa (PR 195) survey at proposed site in Iwahig, team meeting
12. 14 (Mon)	a.m. visit PALECO, Bureaus of Land, Soil (ETOH) city survey, data editing (YAMADA) visit PFO, Agricultural Office (HOSHINO) p.m. meeting with Mr. Dagudo of BFD team meeting

- | | | | | |
|-----|--------------|-------|--|--|
| 13. | Nov 15 (Tue) | 12:00 | Puerto Princesa to Manila (PR 196)
Consultant meeting, team meeting | |
| 14. | 16 (Wed) | a.m. | prepare for discussion with MNR
visit Manila Zoo | (ETOH, HOSHINO)
(YAMADA) |
| | | | collect information at Bio Resources, SEAFDEC | |
| | | p.m. | discussion at MNR
visit SEAFDEC, PIPAC Site | (ETOH, HOSHINO)
(YAMADA) |
| 15. | 17 (Thu) | | discussion at MNR
collect information
interviews with Assistant Minister Capay | (ETOH, HOSHINO)
(YAMADA)
(INOMATA) |
| 16. | 18 (Fri) | | discuss at MNR
visit National Museum, SEAFDEC, Central
Geophysical Exploration | (INOMATA)
(YAMADA) |
| 17. | 19 (Sat) | 6:00 | Manila to Calapan
levelling at the Site
investigation of Mansalay Port | (ETOH, YAMADA)
(HOSHINO) |
| 18. | 20 (Sun) | | levelling and cone penetration test
investigation of Pimamlayan & Socorro | (ETOH, YAMADA)
(HOSHINO) |
| 19. | 21 (Mon) | | Calapan to Manila | |
| 20. | 22 (Tue) | | interviews with Minister Pena, signing on M/D
visit JICA Manila Office
data analysis | (INOMATA) |
| 21. | 23 (Wed) | | Manila to Puerto Princesa (PR 195)
cone penetration test, field survey
collect information, visit PFO | (ETOH, YAMADA)
(HOSHINO) |
| 22. | 24 (Thu) | a.m. | soil survey, levelling at Site
leave for Bozas for investigation | (ETOH, YAMADA)
(HOSHINO) |
| | | p.m. | visit BFD
inspection of water sources near Site | (ETOH)
(ETOH, YAMADA) |
| 23. | 25 (Fri) | 12:00 | Puerto Princesa to Manila (PR 196)
visit Mr. Capay at MNR
report to Japanese Embassy, JICA Manila Office | |
| 24. | 26 (Sat) | 14:35 | Manila to NARITA (19:20) (PR 432) | |

(NOTES) BAI : Bureau of Fishery Office
MNR : Ministry of Natural Resources
PFO : Provincial Fishery Office
PAO : Provincial Agricultural Office

(4) List of Personnel Interviewed in the Philippines

ARNOLD B. CAOILI	M.N.R. DEPUTY MINISTER
ANTONIO Y. CAPAI	M.N.R. ASST. MINISTER
JESUS B. ALVAREZ Jr.	B.F.D. ASST. DIRECTOR
LUS GONZALES	P.W.D/ B.F.D.
L. FERER	P.W.D/ B.F.D.
VICTORIA P. TA-ASAN	NEDA
VICTOR LORETO	FAPMO
LUISA FGNAEIO	FAPMO
RUDY M. LEAL	PWS/ BFD
ERLINDE E. CARRASCO	BFT/ MTI
D. M. GERODIAS	FAPMO. (consultant)
Dr. MANUEL BRAVO	FORI
PELAGIO BAUTISTA Sr.	BFD (Calapan)
FELIX DE GUZMAN	BFD (Calapan)
TED J. RAGUDO	BFD (Puerto Princesa)
ADAM AUSAN	BFD (Puerto Princesa)
EMY COJAMCO	BFD (Puerto Princesa)
CITA LU MANSALÉ	PFDA
DANTE M. JIMENEA	PFO. BFAR (Calapan)
ADOLF G. COMIA	P.A.O.
WILFRED P. INOVEJAS	MNR
Dr. CARME E. CASPE	M.A.
EROSTRO Y. QUETURIO	PFO BFAR
EDWIN T. DUMLAO	
LUIS O. PANTUA	OFFICE OF GOVERNOR, Calapan
FELIX B. ANTONIO Jr.	TFRWSS
ARTURO V. AMURAO	NAI
RICO AXALAN	OMEC
DEMETRIO B. AQUINO	Geodetic Eng'r EDUARDO R. SALVADOR
Dr. JUAN L. UMALI	M.A.
W.A. MASANGCAD	PAGASA (Puerto Princesa Airport)
C.B. PACIO Jr.	DFO. (Roxas)

2. BASIC DESIGN STUDY PHASE-II - II

(1) Minutes of Discussions

MINUTES OF DISCUSSIONS

The Government of Japan dispatched, through the Japan International Cooperation Agency (JICA), the Basic Design Study Team-Phase II headed by Mr. HIROSHI INOMATA, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, to the Republic of the Philippines for seventeen (17) days from 29 October 1984 to explain the Conceptual Design on the establishment of Crocodile Farming Institute (CFI), and to examine and discuss the various issues to be resolved prior to the preparation of the Basic Design Report that follows the current Basic Design Study.

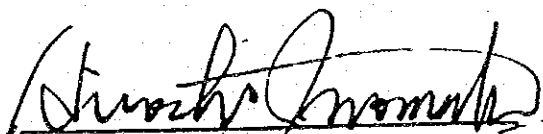
The Conceptual Design was prepared by JICA based on the results of the survey and discussions of the Basic Design Study-Phase I which was conducted in November 1983.

The Team had a series of discussions and exchanged views with the authorities concerned of the Government of the Philippines.

As a result of discussions, the Philippine side principally agreed to the Conceptual Design.

Major points of the discussions are summarized in the attachment herewith.

6th November 1984



HIROSHI INOMATA
Team Leader
Basic Design Study Team-Phase II



JESUS B. ALVAREZ, JR.
Assistant Director
Bureau of Forest Development

1. The proposed site of the Project, which is approximately 10 hectares, is the land to be acquired by the Ministry of Natural Resources (MNR) as shown in Annex I. The Bureau of Forest Development (BFD) of MNR assured the Team that proprietary right on the land, which is owned by the National Council for Integrated Area Development (NACIAD), should be transferred to BFD before the ground preparation by the Philippine side.
2. The Institute will consist of the Buildings, Facilities and Equipment as tentatively shown in Annex II. The Philippine side additionally requested the Team to consider the establishment of lodging for the trainees.
3. The Team will convey to the Government of Japan the desire of the Government of the Philippines that the former takes necessary measures to cooperate in implementing the Project and to provide the buildings and other items as above, within the scope of Japanese Economic Cooperation in Grant Form.
4. The proposed Organizational Set-up for the Institute is as shown in Annex III. The Philippine side assured the Team that the BFD shall recruit and assign relevant personnel necessary for the preparation, maintenance and administration of the Project. The required personnel for the Institute is as shown in Annex IV.



5. The Philippine side assured the Team that BFD should take the necessary measures to procure two hundred (200) crocodiles for the Institute at the initial stage.
6. In addition to the commitments by the Philippine Government as confirmed in the Minutes of Discussions in the Basic Design Study-Phase I, attached as Annex V, BFD shall apply for a Building Permit for the Institute. Further, the Philippine side assured the Team that BFD should take necessary measures for the revetment works of the Irawan River.
7. Based on the results of the discussions held between both sides and further study in Japan, the Japanese side will prepare the "Basic Design Study Report (draft)" and is planning to send a Team to explain and confirm the draft of the Basic Design Study Report in January 1985.



(2) Member List of the Study Team

Name	Speciality	Title
Mr. Hiroshi INOMATA	Leader	Grant Aid Div. Economic Cooperation Bureau Ministry of Foreign Affairs
Mr. Akira SAIKYO	Project adviser	All Japan Association of Reptic Skin and Leather Industries
Mr. Mikio NAKAMURA	Project coordinator	Basic Design Div. Grant Aid Dept. Japan International Cooperation Agency
Mr. Takeo ETOH	Architect	Yokogawa Architects & Engineers, Inc.
Mr. Noboru HOSHINO	Aquacultururer	System Science Consultants, Inc.
Mr. Soichi TAKAI	Equipment planner	System Science Consultants, Inc.

(3) Schedule of the Study Team

	Date	Activities	
1.	Oct 29 (Mon)	10:15 NARITA to Manila visit JICA Manila Office, Japanese Embassy	(PR 431)
2.	30 (Tue)	discussion at BFD visit Assistant Minister of MNR, Mr. Capay handover Questionnaire and Conceptual Design	
3.	31 (Wed)	visit Deputy Minister of MNR, Mr. Caoili discussion at BFD	
4.	Nov 1 (Thu)	All Saints Day	
5.	2 (Fri)	10:00 Manila to Puerto Princesa inspection of Project Site	12:00 (PR 195)
6.	3 (Sat)	a.m. visit Governer and Mayor (Architecture group) Site survey	(INOMATA, SAIKYO) (Equipment group) BFAR District Office PPC fishing port
		p.m. meeting with Mr. Pena inspection of Lobster Farming Center construction site	
7.	4 (Sun)	market research PPC to Manila	Barangay fishing port market research
8.	5 (Mon)	meeting at BFD visit Embassy & JICA Office	(INOMATA, NAKAMURA)
9.	6 (Tue)	signing on M/D at BFD specific discussions w/ BFD	
10.	7 (Wed)	INOMATA and NAKAMURA return to Japan (Architecture group) Manila to PPC Site survey	(Equipment group) meeting with BFD
11.	8 (Thu)	field survey	meeting with BFD
12.	9 (Fri)	field survey (MPWH, PILTEL, CIGI, etc)	visit PAGASA, NTC, BFD
13.	10 (Sat)	test well, field survey data editing	data editing visit SEAFDEC, UP

- | | | | |
|-----|----------|--|--------------------------------------|
| 14. | 11 (Sun) | field survey
PPC to Manila (PR 196)
team meeting | data editing

team meeting |
| 15. | 12 (Mon) | local design office, CMDF
meeting with BFD
visit Mr. Capay | meeting with BFD |
| 16. | 13 (Tue) | Central Bank, NSSC
meeting with BFD
report to JICA Office | Gregorio Araneta Univ.
Foundation |
| 17. | 14 (Wed) | 14:35 Manila to NARITA 19:20 | (PR 432) |

(4) List of Personnel Interviewed in the Philippines

ARNOLD B. CAOILI	M.N.R. DEPUTY MINISTER
ANTONIO Y. CAPAY	M.N.R. ASST. MINISTER
ALEX R. VILLANO	M.N.R. OFFICER OF MINISTER
JESUS B. ALVAREZ JR.	B.F.D. ASST. DIRECTOR
BERNARDO AGALOOS	B.F.D. REGIONAL DIRECTOR : REGION 4
TEODOLO J. RAGUDO	B.F.D. DISTRICT FORESTER (P.P.C.)
JOSE L. LECHONCITO	CHIEF P.W.D./B.F.D.
LUS C. GONZALES	OIC W.M.S./B.F.D.
MARIA L. FERRER	DESK OFFICER W.M.S./B.F.D.
DR. RONIE DE GUZMAN	BIOLOGIST (VETERINARY, MED.)
VALERIANO LADIA	ENGINEER, B.F.D.
MAXIMINO C. LORENZO	ENGINEER, B.F.D.
ROD FUENTES	CHIEF FAPU/P.M.S.
ALAN FERMIL	EQUIP. PROCUREMENT/P.M.S.
RODOLFO LEAL	EXECUTIVE OFFICER/P.M.S./B.F.D.
D.M. GERODIAS	FAPMO./M.N.R. (Consultant)
NESTER VENTURILLO	PROJECT EVALUATION OFFICER/FAPMO
EMY COJAMCO	B.F.D. (P.P.C.)
MEL ZUELA	B.F.D. (P.P.C.)
VICTORIA P. TA-ASAN	NEDA
TEODOR Q. PEÑA	EX. M.N.R. MINISTER

(Metro Manila)

EDILLO P. MONTEMAYOR	M.P.W.H.
BOSOR ISFURIS	M.P.W.H.

PEDRO VIRAY	N.P.P.C.
ROLANDO C. SIANGHIO	R.C.S.A.
MENANDRO E. BENAVIDES	R.C.S.A.
FRANKLIN R. LAGERA	R.C.S.A.
ENGRACIO D. ANG	R.C.E.C.
JESUS S. MAÑEGO	A.E.C.
WILFREDO S. PENULIAR	A.E.C.
ALBERTO A. ABANILLA	A.E.C.
RESTY V. BUENVIAJE	A.E.C.
JOSELITO C. BALTAZAR I	E.S.T. CO., INC.
JOEL R. UMANDAP	J.T.C.
ROLANDO A. FONDEVILLA	J.T.C.
KEIICHI TANAKA	C.M.D.F.
DR. FELIPE GARCIA	DEAN, I.V.M./G.A.U.F.
DR. MARIANO AUSTRIA	DIRECTOR, V.P./
MANELDA C. LABIANO	N.T.C./R.F.C.

(Puerto Princesa City)

CARMELITO C. LAMPA	P.C.B.S., INC.
NICDA P. LEONOR	P.C.B.S., INC.
ABELARDO SEMBRANDO	P.C.B.S., INC.
RAFAEL VALENCIA	CITY ENGINEER
MARIO DAQUER	CITY HALL (INFORMATION OFFICER)
ANGEL RADON	CITY PLANNING & DEVELOPMENT BOARD MEMBER (CITY DEVELOPMENT COORDINATOR)
RODOIJO AGUIRRE	"
RICARDO DINAFANTA	" (PRESIDING OFFICER)
LEONILA ACABADO	"

JOHN FABELLO

CITY PLANNING & DEVELOPMENT
BOARD MEMBER
(ZONING OFFICER)

RUFINO YAZOA

"

EUSEBIO RABANG

"

ENRIGCIE SEBIDO

"

EDWIN OLWEROS

"

PANLINO H. LACAO

WATER DISTRICT

FREDDIE VALDEZ

WATER DISTRICT

LACSAMANA

P.G.D./P.G.

LORENZO E. RODRIGUEZ

M.P.W.H. (P.P.C.)

Engineer TRAJICO

M.P.W.J. (P.P.C.)

EDGARDO G. IGNACIO

C.I.G.I.

ISAAC S. PABLO

PALECO

NICK ELAURIA

PALECO

FRANK G. TALAZAR

PILTEL

MICHAEL G. SANTOS

MADECCO

3. FINAL REPORT DRAFT MISSION

Minutes of Discussion

The Draft Final Report of
Basic Design Study on
Crocodile Farming Institute
Project
in
The Republic of the Philippines


The Government of Japan dispatched Missions to carry out the Basic Design Study on the Crocodile Farming Institute Project through Japan International Cooperation Agency (JICA) in November 1983 and October 1984, respectively.


The Missions carried out field surveys, held series of discussions and exchanged views with the Philippine delegation headed by Mr. Jesus B. Alvarez, Jr., Assistant Director of the Bureau of Forest Development.

As a result of these surveys and discussions, JICA prepared a Draft Final Report on the Study and dispatched a Basic Design Team headed by Mr. Hiroshi Inomata, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, to discuss it with the Philippine delegation between the period of February 4th to 7th, 1985.

Both parties confirmed the result of the discussions attached herewith.

February 6, 1985


MR. HIROSHI INOMATA
Leader
Japanese Study Team


MR. JESUS B. ALVAREZ, JR.
Assistant Director
Bureau of Forest Dev.

MAJOR POINTS OF UNDERSTANDING

BASIC DESIGN

1. The Philippine side has principally agreed to the basic design proposed in the Draft Final Report, and appropriate alterations agreed during the discussions will be incorporated in the Final Report.
2. The Final Report (10 copies in English) on the Study will be submitted to the Philippine side by the end of March 1985.
3. The Philippine side understood the system of Japan's Grant Aid Programme and the arrangements to be taken by the Philippine side for realization of the Project.

(2) Member List of the Draft Mission

Name	Speciality	Title
Mr. Hiroshi INOMATA	Leader	Grant Aid Div. Economic Cooperation Bureau Ministry of Foreign Affairs
Mr. Akira SAIKYO	Project adviser	All Japan Association of Reptic Skin and Leather Industries
Mr. Mikio NAKAMURA	Project coordinator	Basic Design Div. Grant Aid Dept. Japan International Cooperation Agency
Mr. Takeo ETOH	Architect	Yokogawa Architects & Engineers, Inc.
Mr. Soichi TAKAI	Equipment planner	System Science Consultants, Inc.

(3) Schedule of the Draft Mission

Date	Activities
1. Jan 31 (Thu)	10:15 NARITA to Manila 13:30 (PR 431) (ETOH, TAKAI) visit JICA Manila Office, Japanese Embassy
2. Feb 1 (Fri)	discussion at BFD; purpose and schedule of mission, draft report
3. 2 (Sat)	visit local design office, concrete plant survey on construction situation examination of draft report
4. 3 (Sun)	
5. 4 (Mon)	examination of draft report discussion at BFD; running cost, grading work, equipment and machinery 10:15 NARITA to Manila 13:30 (PR 431) (INOMATA, SAIKYO, NAKAMURA) team meeting
6. 5 (Tue)	visit JICA Manila Office, Japanese Embassy discussion at BFD visit JICA Manila Office, Japanese Embassy (INOMATA, NAKAMURA) investigation of sewage treatment system of a hospital, etc.
7. 6 (Wed)	visit Minister Cailli and Assistant Minister Nograles at MNR signing on M/D investigation of PETROLAB report to JICA Office and Japanese Embassy (INOMATA, NAKAMURA) visit local design office, etc.
8. 7 (Thu)	settlement of accounts, packing 14:35 Manila to NARITA 19:20 (PR 432) (INOMATA, NAKAMURA, ETOH, TAKAI)

(4) List of Personnel Interviewed in the Philippines

ARNOLD B. CAOILI	M.N.R. DEPUTY MINISTER
JOSE C. NOGRALES	M.N.R. ASST. MINISTER
ANTONIO Y. CAPAY	M.N.R. ASST. MINISTER
JESUS B. ALVAREZ JR.	B.F.D. ASST. DIRECTOR
RULEEN B. RAYALA	ASST. CHIEF P.W.D./B.F.D.
LUS C. GONZALES	OIC W.M.S./B.F.D.
MARIA L. FERRER	PROJECT MANAGEMENT STAFF/B.F.D.
DR. RONIE DE GUZMAN	BIOLOGIST (VETERINARY, MED.)
NESTOR VENURILLO	PROJECT EVALUATION OFFICER/FAPMO
ALAN C. SALVADOR	M.N.R. (TECHNICAL CONSULTANT)
MAXIMINO C. LONRENZO	ENGINEER, B.F.D.
VALERIANO LADIA	ENGINEER, B.F.D.

3. REPO

4. REPORT ON TRIAL WELL AND
REPORT ON QUALITY ANALYSIS OF WELL WATER



MARIO P. SANDOVAL

CONSULTANT - GEOLOGIST

29 KALAW HILL SUBDIVISION
TANDANG SORA AVENUE
QUEZON CITY

P.O. BOX 131, U.P.
DILIMAN, QUEZON CITY
PHILIPPINES
TEL. NO. 97-23-68

MNR - ALL JAPAN ASSOCIATION
Well No. 1

RECOMMENDATIONS

1. At the maximum available drawdown which will not expose the top screen, the well may be pumped at the rate of 120 GPM or 655 cumd; if the owners are willing to expose the top screen section, a yield of 150 GPM or 818 cumd is possible.
Handwritten notes: 455 GPM/min, 568 GPM/min
2. Additional well development may be warranted to improve the efficiency of the well.
3. General pump specifications are detailed in a later section and table.

WELL AND AQUIFER CHARACTERISTICS

Specific capacity after 24 hours pumping is 29.6 cumd/m or 1.65 GPM/ft.

Transmissivity coefficient based on the drawdown plot (please refer to attached figure) is 64 m²/day or 5200 GPD/ft.

Transmissivity coefficient based on the recovery plot is 46 m²/day or 3750 GPD/ft.

Taking into consideration the well specific capacity the more acceptable transmissivity value is 46 m²/day.

MAJA - 2

DETERMINATION OF EXPECTED PUMPING WATER LEVEL AT A
DISCHARGE RATE OF 300 GPM or 1636 CUMD

By Logan's Approximation method:

$$T = 1.22 \frac{Q}{s}$$

$$s = 44 \text{ meters}$$

Expected pumping water level = 47.6 m

By well specific capacity:

$$SC = \frac{Q}{s}$$

$$s = \frac{1636}{29.6} = 55.3 \text{ m}$$

Expected pumping water level = 59 meters

At the computed pumping levels, at least three(3) screen sections will be exposed and although it may be theoretically possible to pump 1636 cumd from the well such option is not practical. Moreover, the yield will definitely decrease if the aquifers opposite the exposed screen sections will be partially dewatered.

RECOMMENDED DISCHARGE RATE BASED ON MAXIMUM AVAILABLE
DRAWDOWN AND WELL SPECIFIC CAPACITY

1. Maximum available drawdown without exposing any well screen = 26 - 3.6 = 22.4 meters

Computed discharge rate = 655 cumd or 120 GPM

2. Maximum available drawdown which will expose the first screen section = 32 - 3.6 = 28.4 m

Projected discharge rate = 818 cumd Or 150 GPM

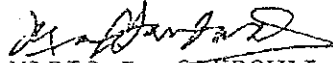
Md

GENERAL PUMP SPECIFICATIONS

Rated Capacity cumd (GPM)	Discharge Pressure m (ft)	Total Dynamic Head m (ft)	Maximum Motor Rating (HP)
655 (120)	0	30.5 (100)	7.5
655 (120)	18.3 (60)	51.8 (170)	10
818 (150)	0	36.6 (120)	7.5
818 (150)	18.3 (60)	58 (190)	15

Riser pipe diameter - 76 - 100 mm

Pump setting should be at least 18.3 m below expected pumping water level.


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