2.3 BASIC DESIGN

2.3.1 Design Concept

The design policies are laid out as follows taking into account the environmental conditions of the expected construction site and aiming principally at ensuring the functionability, durability, cost effectiveness in accord with the contents of this project plan.

(1) Setting proper grades

The grades to be set for the buildings and the equipment shall not be uniform for all the facilities; they shall be suitable for the surrounding environments of the building sites and their forms of utilization. The RDCB zoological division located in the LIPI's life science complex makes it a basic principle to set such grades as match both the Biotechnology R&D Center and the Limnology R & D Center that are already existing or under construction in the facility. Regarding the PHPA-related facilities, the principal aim shall be their durability and constructability instead of high grades, considering that both the HQ and the RS are not complete in terms of infrastructure and access. As to the NCIC, since additional construction for the expantion is planned by the Indonesian side, it was agreed to look at the situation under the assumption of grading office buildings in general.

(2) Functional and easy-to-operate facility configuration

The RDCB zoological division, of which combined functions are required, consists of four departments, i.e., administration, research, information, and specimen storage. These are added by the seminar room and the canteen to form an installation precisely zoned and clearly configured to avoid any hindrance to daily activities of other departments. The specimen storage shall put the future additional construction into consideration. Nevertheless, neither of PHPA's HQ and RS has sufficient space to spare at the building site and, to make the matter worse, the land is shaped rugged. Therefore, a separated-building type shall be employed so that, instead of carrying out large-scale ground-leveling, the present condition of the land is allowed to remain while making the layout of buildings as functional and flexible as possible.

(3) Design suitable for the environments

Allowing for the tropical meteorological condition, the design shall incorporate eaves and louvers to shut out the solar radiation and severe squalls. The design shall also be aimed at natural lighting and natural draft so as to not only minimize the load on machine facilities requiring electricity but also obtain a comfortable and pleasant living environment.

(4) Conformity with technical cooperation

The technical cooperation associated with this project is planned to start from July, 1995. Therefore, sufficient primary meetings shall be held to discuss the contents of the facilities and those of equipment to be provided to bring about a well-coordinated facility program, thus facilitating the technical cooperation activities.

(5) Facilities with low maintenance expenses and easy maintenance

The plan shall stress energy saving, simplification of the facility system, and durability of equipment and materials, aimed at a facility requiring low running costs. In selecting building materials, the local ones shall be preferred; however, further thoughts shall be put in to ensure that the materials are strong and easy of maintenance and that the method of construction is suitable for the local building technology. Especially, for the RDCB's zoological division, which has specimen storage requiring air-conditioning for 24 hours, the facility plan shall be aimed at high heat insulation performance, thus reducing the running costs deriving from the air-conditioning power.

2.3.2 Basic Design

(1) Building site and layout

1) RDCB zoological division facility
In view of the fact that the building site is located in the LIPI-owned Life Science Center (LSC) in the Cibinong, Bogor Prefecture, JAWA BARAT, the plan here is required to be adjusted to the master plan of this complex. The LSC, which is located about 3 kilometers from the

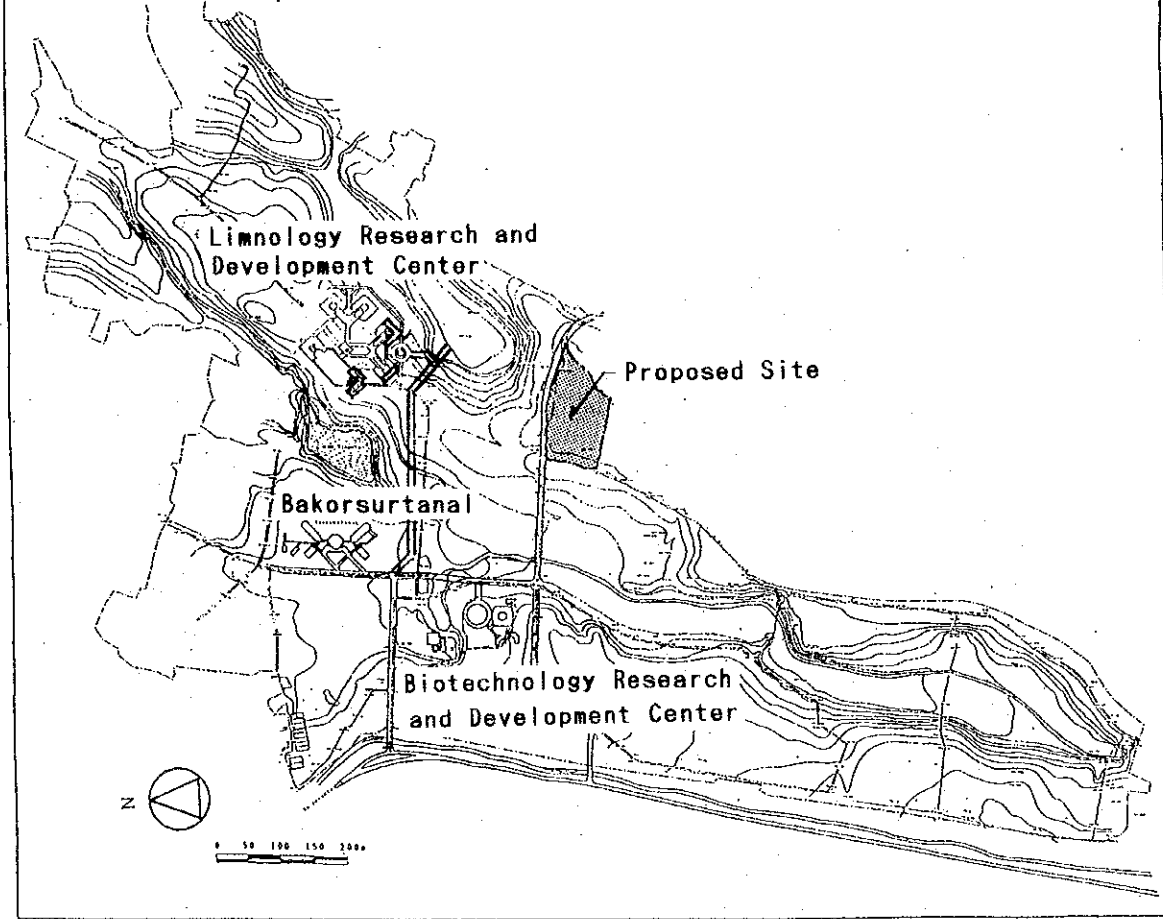
exit for Cibinong of the Bogor-Jakarta highway in the Cibinong Prefecture, is surrounded by local inhabitants' private houses and farming fields. The land as a whole consists of comparatively gentle slopes which vary little in their altitudes. However, the geographical ups and downs are comparatively substantial in the area running through the central part from the north to the south and the area in the environs of the north-east of the building site, thus creating depressions with rivers running through and with ponds lying here and there.

- Outline of the life science center (LSC)
  The acreage of the building site planned for construction of the facilities in the LSC is 189.9 hectors, which is itemized as follows ;
  - Land to be used for the biotechnology research and development center (30.0 ha)
  - Roads, lakes and marshes, rivers (15.2 ha)
  - Land to be used for the BAKOSURTANAL (Badan Koodinasi Survey dan Pemetaan Nasional) (3.7 ha)
  - Land to be used by local inhabitants (141.0 ha)

  Since the beginning of the Sixties, the area has been targeted for scientific and technical research under the national plan. In 1987, a comprehensive master plan was drawn up for the whole of this area. The facilities planned in the LSC's master plan to cover the whole area include not only research & experiment facilities, office facilities, and auxiliary facilities but also accommodations and houses for researchers, staff members, and guest researchers - with an eye to round up all the LIPI's research and development facilities, scattered all over the country, into a single location. Those already built include various facilities related to the BAKOSURTANAL and part of the Biotechnology R&D Center building. The building for the Limnology R&D Center is currently under construction.
  The master plan of the whole area is basically divided into the following four zones ;

  a) North zone
     The facilities in this zone can be extended. As a residential zone, it contains accommodation facilities for employees and researchers, shops, and sports facilities.

Table 2-3-1 Proposed Site for RDCB Zoological Facility



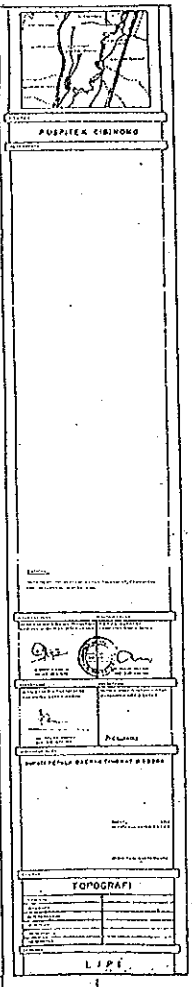
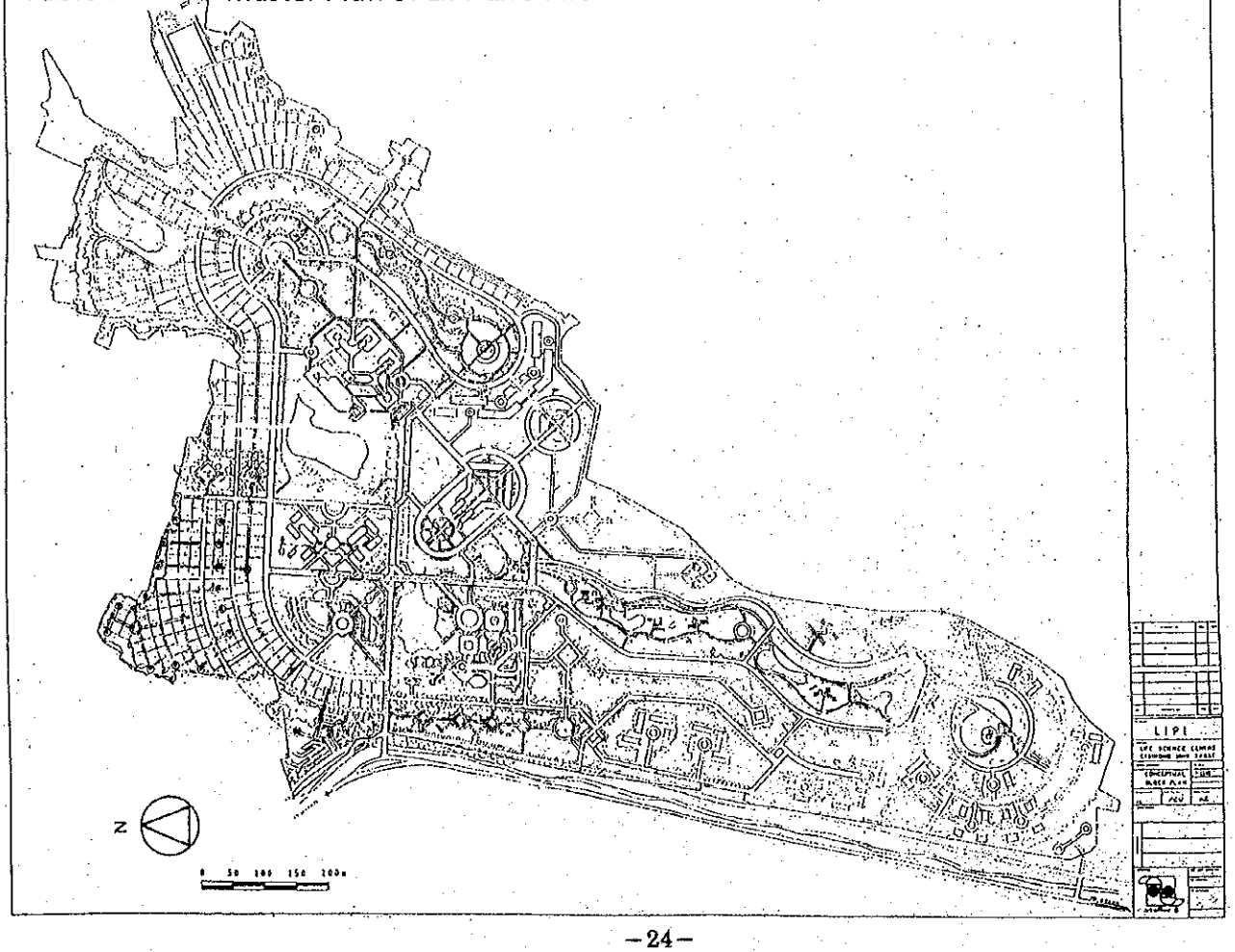


Table 2-4-2 Master Plan of LIPI Life Science Center



b) Central zone

Equipped with various centers for academic activities and business affairs, this is a central zone of the complex. The planned Limnology R&D Center and the existing BAKOSURTANAL building will be joined together. In this zone, construction of a business center, a scientific data information center, a shared facility, and an integrated lab is planned.

c) West zone

Consists of the green belt, the rare-plant botanical garden and industrial park zone. The southeastern part is the site for embryo seed culture.

d) Heartland zone (shared)

Located at the center of the whole LSC site and running from north to south, this zone is a depression topographically. Its locational conditions enable this zone to be a space shared by various facilities - as an environment resembling a park. The R&D center building is planned to be two- or three-storied, whereas the business center, data information center, and integrated lab buildings to be built in the middle of the site are planned to be three- to five-storied. The future plan is to establish a network system of the following infrastructural facilities within the compound.

- Public water supply system
- Waste water treatment and management system
- Rainwater drainage facilities and system
- Communications system (optical-fiber based)
- Electric system (Power allocation)
- Fire-fighting system
- General facility supply system

- Utilization of the building site

The facility (for the RDCB zoological division) planned for the relevant site in the master plan had a symbolic seven-storied pyramid shape, located where the axis for the administration zone and that for the biology zone overlapped.

This was examined from the following two viewpoints ;

- This facility is a research installation with specimen storages as the central structure. Its excessively symbolic quality is off the objective.
- In the present situation where the infrastructure improvement is being made for each planned building, it is considered necessary to plan a layout that is well-coordinated with the existing infrastructural facilities (such as existing roads and power lines).

As a result, the following points were raised in utilizing the building site.

- Placement of the facility where two axes overlap each other shall be avoided because this will result in installing part of the facilities on the existing road. Therefore, the facility shall be placed on the southern part of the site.
- The facility shall be placed straight to both two axes and to the existing road.
- Thoughtful considerations should be given to the spacing between the buildings and the peripheral service roads and the surrounding facilities.
- Multi-purpose functions such as specimen storages, research, information, seminar, etc. are expected of this facility. In this sense, it is strongly possible that turning it into a symbolic form may cause even partial loss of its functionability. Therefore, to avoid this, a low-story (two-story) building is planned to utilize the wide stretch of the site. Making a full use of the advantages of a low-story building, the additional construction area for specimen storages, etc. shall be secured.
- The square shape used often in the master plan is used for this facility as well for harmony with surrounding facilities.
- The building site is located higher than its environs. However, as there is no level specified for the floor level, of the building, the settings shall be such that raising the ground level shall be suppressed to the minimum.

- Facility layout

  Attaching great importance to coordination with the master plan, two facility layout shall be based on two square shapes overlapping each other. The square on the west side consists of the administration zone, the information zone, and part of the research zone. The square on the east side consists of the research zone and the specimen storage zone. Of the spaces lying between the squares, the one in the north is planned as an approach zone; and the in the other south as a garden zone. The approach zone is positioned not only to facilitate the access going parallel with the master plan's administration zone axis and the biology zone but also to avoid strain on approaching from the existing road. The garden zone in the south is allotted with a canteen. The east and south sides of the building site are planned to be provided with service roads, along canteens, specimen storages, and energy buildings are to be arranged thus aimed at facilitating services in the future. Additional construction of specimen storages in the future shall be coped with by securing a space along the inner side of the service road. An effective way of reducing the steam heat caused by the solar radiation is to arrange the buildings along the eastwest axis. However, to make the layout inclined by 45 degrees in a harmonious coordination with the master plan, this plan shall take the form of providing a buffer zone to become a casing the periphery.

2) GHNP HQ

a) Utilization of the building site

The building site consists of two areas with the road lying inbetween. The area on the east side contains flat parts and slightly elevated hills. The area on the west side is a steep hill. In this plan, the flat part of the eastern area is going to be used as it is most suitable for facility construction. The flat part of the eastern side is sloped gently northeastward. Therefore, to reduce the need for landscaping as much as possible, a flat and huge building is not advisable. Instead, it is desirable to build in small units. The higher part of the hill is planned by the Indonesian

side as a site for buildings for staff accommodation; therefore, construction of access roads requires consideration.

b) Facility layout

The flat part suitable for facility construction is small and even the flat part is sloped. Therefore, the plan divides the construction into smaller units built on different levels one differing from another by 50 to 60 centimeters. This enable reduction in the land preparation work. The building consists of five pavilion-roofed units. Three building units, i.e., the administration block, the research block, and the information & training block, are on the west side. On the east side, the guesthouse is positioned with the utility block inbetween. The buildings on the west-side zone are placed close to each other to achieve strong mutual relations. In planning the guesthouse, consideration was given to its surrounding for protection of privacy as well as sufficient space for future extension.

3) GHNP RS

The gently sloped northwest side of the building site is surrounded by trees and grass. There are also some trees halfway up the site and, therefore, buildings should be arranged in such a manner that as many trees as possible are allowed to remain where they are. Because the whole building site is higher by 1.5 to 2.0 meters than the road located in the front, the space for parking cars is secured at the lowest location to minimize the cutting earth. The buildings shall be in two units of differing functions, i.e., the management block and the guesthouse. The floor levels shall be planned to be on different levels in adjustment to the different levels of the sloped building site.

4) NCIC (Nature Conservation Information Center)

With the widening of the front road in accordance with the regulations of the Bogor City, buildings are not allowed within 20 meters from the front road, thus limiting them further back (west) into the site. The west side of the site is a cliff about 7 meters high stretching to a small stream further down. Therefore, in the present condition of no

protective work done to the cliff surface, the buildings will be forced to stand almost in the middle of the site. Also, because the NCIC's plan contains future expansion of the facilities, the inner part of the site was reserved for this purpose. At present, an existing PHPA branch office is located in this building site ; the Indonesian side needs to demolish it, and it takes about two months for the demolition due to the necessary procedure.

(2) Facility and building plan

1) Planning

a) RDCB zoological division facility

When setting the number of stories for this facility, attention shall be paid to ensuring minimal up/down movements and close functional relations between floors. Furthermore, in view of the need that the term of the construction work be reasonable as a grant assistance project, a two-story building was considered to be proper. The facility mainly consists of four zones. The research zone is planned to be fitted with the one side corridor type, which makes natural draft and natural ventilation easy. As all of the staff rooms shall be of the private room type, they shall be fitted with the middle corridor type, whose traffic lines with various rooms are shorter and more effective than the one side corridor type. The zoological division facility shall be of a corridor type encircling the inner court. In principle, all the rooms can be blessed with natural illumination and natural draft. The square shape in line with the master plan is formed by this corridor. There are two squares encircling the inner court; the one on the west side consists the administration zone, the information zone, part of the research zone ;

the one on the east side consists of the research zone and the specimen storage zone.

The composition of each zone is as follows ;

- Administration zone

  The administration zone is located on the first floor of the west block. The office is located on the entrance hall side. The director room and the expert rooms are located further in.

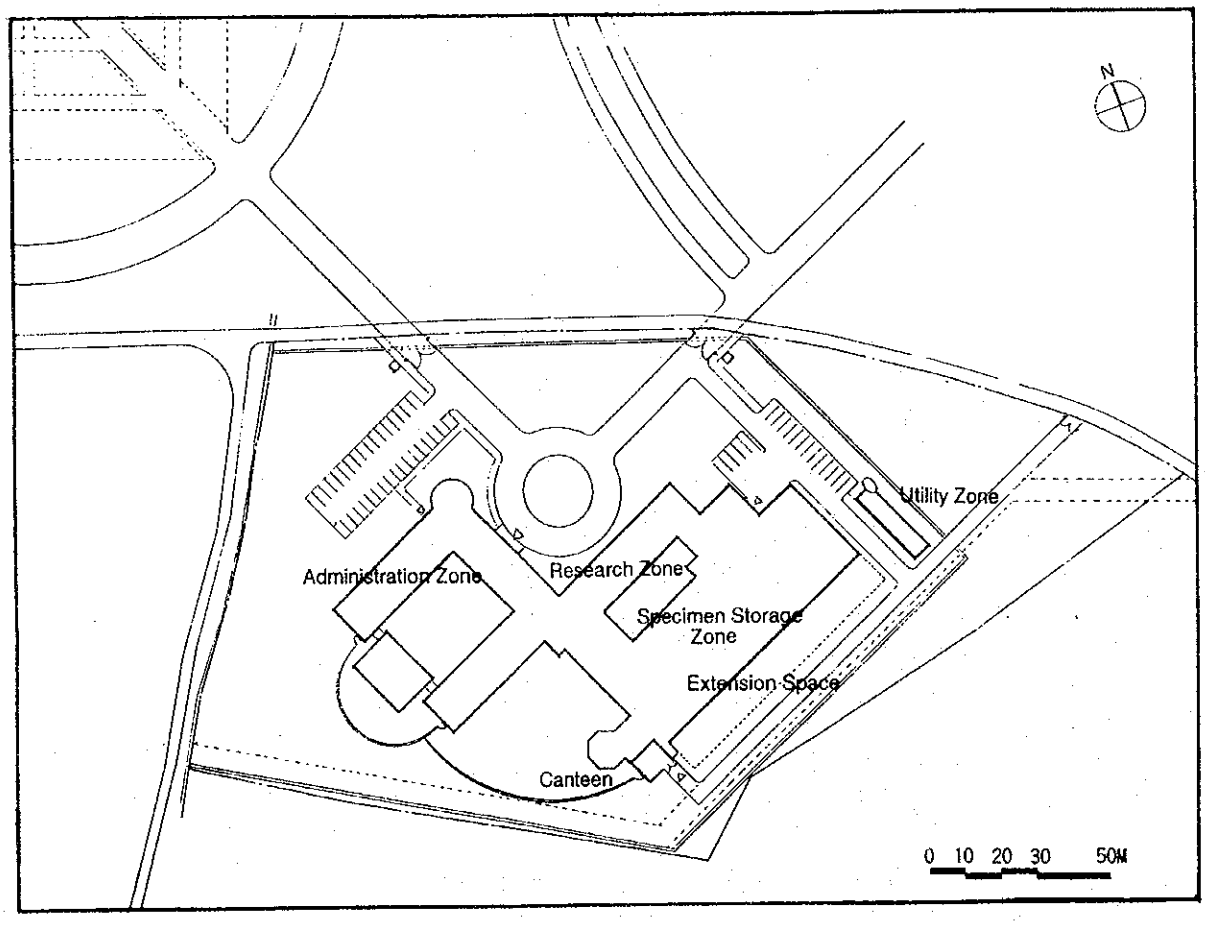
- Research zone

  The research zone is located extending over both the west and east blocks. Both the first and second floors of the east block consist of staff rooms. The first floor of the east block consists of various laboratories; the second floor consists of staff rooms.

- Information zone

  The book & material room is located on the second floor of the west block, which is close to both the administration zone and the staff rooms. The information processing room is placed close to the research rooms, thus on the second floor of the east block. A garden part is secured as the space for extension in the future. The information room, where panel exhibitions and specimen exhibitions, etc. are held, is placed by the entrance hall, which is on the first floor of the west block, taking into account the need for easy understanding and access by visitors.

Layout of Facilities



- Specimen storage zone

  Located on the first and second floors of the east block. Each specimen storehouse contains a specimen processing room, a specimen identification room, and a study room. According to the plan, the external wall surfaces and RC walls of the specimen storehouses are sprayed on with sufficient amount of heat insulating material; and the roof is of RC slabs covered by a thatched roof to avoid the influence of the external high temperature. The specimen storages on the first floor are mostly those containing wet specimens, which are not so easily affected by moisture. The first floor is also planned to have an unloading space and an elevator to facilitate carrying in/out of specimens. For possible extension of the specimen storages in the future, there is a space secured along the service road of the southeast side.

- Seminar room

  The seminar room is arranged on the first floor of the west block, in a shape facing the entrance hall. Built in a pit style, this seminar room will be able to seat up to about 80 persons.

- Canteen

  A canteen will be attached to the east block, facing the garden. The building will be one-storied providing a 55-seat dining space, a kitchen, and a service court.

b) GHNP HQ

The GHNP HQ consists of five flat-roofed buildings with almost the same size. As each building is dedicated to a particular division, there is no need for corridors inside the building. According to the design, contacts between the buildings can be freely made via external corridors.

- Administration block

  Various administration division rooms including the director room and the expert rooms are located in this block.

- Research block

  Consists of several rooms involved in park research and management. In the drafting room, the park management system based on personal computers is also used. In the

research room, specimen processings and simple observations are conducted.

- Information and training block
  Consists of a single room equipped with a book corner and use for training as well. The book corner is designed to have a movable partition to be used simultaneously with other activities.
- Guesthouse
  The guesthouse has five rooms each for two persons. The shower of the toilet is designed for sharing, except one room equipped with its own. The kitchen, which is a shared self-service style, is located by the dining room.
- Utility block
  Consists of a 12-seat staff canteen, a workshop for wheel services, and a pray room.

c) GHNP RS

Consists of two buildings of the same size, i.e., the administration block and the guesthouse.

- Administration block
  The administration room and laboratories where the PHPA staffs are permanently stationed are located in this block. Simplified processing and observation of specimens collected are carried out in the laboratories.
- Guesthouse
  The guesthouse has five rooms each for two persons. The shower of the toilet is designed for sharing, except one room equipped with the private unit. The kitchen, which is a shared self-service style, is located by the dining room.

d) NCIC (Nature Conservation Information Center)

The administration zone is located on the first floor of the center; the information & training zone is located on the second floor.

- Administration zone
  The entrance hall is planned with panel exhibitions so as to be used as a information corner as well. The administration zone consists of the administration room, the director room, and the expert rooms.

- Information & training zone
  Consists of the information-related staff room, the conference room used as an training room as well, and the information processing room with an emphasis on GIS.

- Facility composition

This facility consists of the factors above described. In expressing the various rooms needed by each factor in the form of a floor plan, each facility shall be composed with blocks or zones, thus demonstrating a high functionality with clear flow and floor level planning. Paying sufficient attention to the convenience of each facility, the contents of the block to zoning configurations are shown below ;

a) RDCB zoological division facility
   - Administration Zone
     Administration room, director room, meeting room, expert rooms, etc.
   - Research Zone
     staff rooms, laboratories, equipment room, low-temperature warehouse, storage, etc.
   - Information Zone
     information & display room, CPU room, library, etc.
   - Specimen Storage Zone
     unloading space, fumigation room, conservation storage, processing room, identification room, specimen storage, etc.
   - Seminar Room : seminar room, storage, lobby, etc.
   - Canteen : dining room, kitchen, etc.
   - Others : corridor, machine room, electrical room

b) GHNP HQ
   - Administration Block
     administration room, director room, meeting room, expert rooms, etc.
   - Park Survey Block
     park survey and administration office, drafting room, laboratory, etc.
   - Information and Training Block
     library, training room, etc.

- Guesthouse
  accommodation rooms, private kitchen, dining room, etc.
- Others
  canteen, workshop, generator room, etc.

c) GHNP RS
- Administration Block
  administration room, laboratory, specimen storage room, dining room, etc.
- Guesthouse
  accommodation rooms, private kitchen, dining room, etc.

d) NCIC (Nature Conservation Information Center)
- Administration Zone
  administration room, director room, expert rooms, information corner, etc.
- Information & Training Zone
  meeting & training room, information processing room, etc.
- Others
  storage, machine room, etc.

- Setting the room sizes

  The sizes of rooms were set after defining the functions of the rooms clearly and checking the personnel assignment based on the requests made by Indonesian side, which understands that the size of each facility to be set will be appropriate to accommodate the personnel to be assigned in 5 years since the opening day. The functions and sizes of the major rooms are as follows ;

  - Office rooms

    In designing the office rooms, the customs in Indonesia and the present conditions of the existing facilities have been put into consideration. Thus, in principle, the plan adopted the large open-room style, which excels in communication among staff, for office rooms for regular government services; and the cabin style single room for senior positions. With the floor space of 7.0 square meters per person for the open style and 15 square meters per person for the cabin style single room as yardsticks, the floor area requirement of each office room has been calculated based on the personnel location plan.

- Staff rooms

  The research installation of the existing RDCB zoological division has adopted the cabin style single room for all staff rooms. The same cabin style single room is adopted in the current plan as well while giving thoughtful consideration to their research environments. For calculation of a standard space for the staff rooms, the floor space of 10.0 square meters per person was used as a barometer. The plan is based on 64 staffs as well as two rooms for visiting researchers.

- Seminar room & training room

  Trainings and seminars are planned to be provided in the research installation of the RDCB zoological division and the GHNP HQ. In the research installation of the RDCB zoological division, a major emphasis is put on seminars by researchers. Records show that most of the seminars held so far consisted of no more than 70 participants and only two or three seminars had more than 100 participants. Therefore, the design for the seminar room is aimed at a slightly spacious seminar room, allowing about 80 people. Seminars exceeding 100 participants will be required to use the Bogor LIPI·RDCB's seminar hall. In the GHNP HQ, it is assumed that the PHPA's internal trainings will occupy most of the activities consisting of about 30 people. The floor area requirement of each room was calculated based on the floor space of 2.5 square meters per person as a barometer.

- Book & storage

  This is a book and material room not only for the researchers in the RDCB zoological division but for visitors to the center. Presently, the library has 42,000 volumes and is expected to have about 60,000 eventually. The library will be used based on the same type as the existing the closed access type. And the existing book shelves and reading tables will be moved into the new library. The library will be staffed by two persons and equipped with 18 reading seats; and its required acreage will be secured based on the furniture layout. The total floor area of the library and material room is planned to be 248 square meters, with reading space at 151 square meters (reception counter space included), the book room at 77 square meters, and the work space at 20 square meters. The PHPA-HQ's book corner is

planned to be shared as an in-service training room as well. However, to allow it to be as a book corner even during in-service training, enough space is secured to enable installation of movable partitions and carrels.

- Information processing room

  The information processing room is set up at the RDCB zoological research installation and at the NCIC (Nature Conservation Information Center). The zoological research installation will consist of the specimen database system, the geographical information system, and the image analysis system; five persons are planned as the staff. Based on the equipment layout, the required rooms will include the computer room occupying the floor space of 136 square meters, the printing room of 38 square meters, and the staff room of 38 square meters, thus totaling 212 square meters. The computer room and the printing room will stand on a free access floor, aimed at easy wiring. To cope with the LAN system in the future, some empty pipes will also be installed here. The NCIC consists of the geographical information system and the image analysis system. The floor area requirement is 66 square meters of the computer room, which will stand on a simplified free access floor to cope with future layout changes.

- Laboratories

  The optimum numerical value is set for each laboratory based on the layout of various pieces of research and experiment equipment. The RDCB zoological research installation consists of large-room laboratories and special laboratories. Each of the special laboratories is set up for each equipment which requires sophisticated measuring precision or air conditioning, etc.

- Specimen storages

  The Indonesian side desired the tolerance for 25 years. However, as it was strongly felt that the required investment had to be made beforehand, shorter-term goals were set on an annual basis (as with the personnel plan, it was too short to set 5 years since opening of the place for coping with the ever-increasing number of specimens; therefore, the plan was settled at the tolerance capable of

accommodating the quantity of specimens in 10 years after opening) while sufficient thoughts were given to space for expansion of the specimen storages. The racks for storing the specimens were decided to be of the GEF-aided movable type (2,220 H x 1,840 W x 6,000 D). Therefore, the size of each specimen storage was set based on the number of specimens in target 10 years since the opening calculated into the length of the movable type rack.

- Specimen processing rooms

  Various independent processing-related rooms are to be attached to each specimen storehouse. Consisting of the processing room of 36 square meters, the quarantine room of 11 square meters, the specimen registration room of 32 square meters, the administration office of 7 square meters, and the reading room of 20 square meters, these attached rooms will occupy a floor space of 100 square meters. The entomological division has a separate plan for a processing room of 30 square meters for immersed insect specimens.

- Canteen

  Canteen is planned for the RDCB zoological research installation and the HQ, because they do not have any dining places nearby for their staff. The canteen for the former will be targeting the whole 95 members of the staff and about 15 specialists and visiting researchers. The planned space will be occupy about 138 square meters (kitchen included) involving 55 seats based on two shifts. When users of the facility are increased in number due to seminars, etc., the dining times will be adjusted accordingly. The canteen for the HQ, intended for 18 staff, is planned to have the space for 12 seats based on 1.5 shifts. Also, at the HQ's guesthouse and at the RS, a private-kitchen and dining space is secured for 10 persons.

- Guesthouse

  At the HQ and the RS, guesthouses are planned for visiting researchers. Considering that the houses are prepared as temporary accommodation facilities for researchers, thus offering lodging charges at mere cost, the guesthouses will be based on a style as simple as possible and all of them will be two-person rooms (14 square meters). In each of the two guesthouse facilities, only one

Table 2-3-1 Calculation Basis of Rooms

RDCB Zoological Facility

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Administration			
Director Rm.	1	including meeting space	26
Expert Rm.	1	including meeting space	24
Secretary Rm.	2	2 secretaries including waiting space	36
Meeting Rm.		for Director and Experts 15persons × 3.2m^2/person = 48m^2	50
Adm. & Manage Rm.	9	Deputy Director, 2 Chieves and 7 Staffs 2persons × 15m^2/person = 30m^2 7persons × 7m^2/person = 49m^2	74
Sub Total			210
Research Zone			
Staff Rm.	66	including 2 rooms for visiting researchers 66persons × 10m^2/person = 660m^2	683
Reproduction Lab.		based on equipment layout	72
Genetics Lab.		based on equipment layout	72
Nutrition Lab.		based on equipment layout	72
Kitchen Lab.		based on equipment layout	18
Elec. Microscope Rm.		based on equipment layout (with ante room)	26
Weighing Rm.		based on equipment layout	22
Cold Rm.		based on equipment layout	34
Ecology Lab.		based on equipment layout	65
Chemical Stg.		based on chemical cupboard layout	29
Equipment Stg.		based on equipment cupboard layout	20
Studio		including equipment stg., storage and dark room	74
Meeting Rm.		for the staff of biology	36
		for the staff of ecology	18
		for the staff of physiology	18
Sub Total			1,259
Information Zone			
Library	2	including 18 reading chairs, reception counter and space for staff	127
Book Stg.		based on the layout of movable bookshelves	101
Working Rm.		for making documents	20
Computer Rm.		based on equipment layout	136
Printing Rm.		based on equipment layout	38
Staff Rm.	5	5persons × 7m^2/person = 35m^2	38
Display Rm.			98
Sub Total			558
Specimen Storage Zone			
Specimen Stg.		for temporary storage of specimen	29
Freeze Rm.		deep freezer for specimen (0~4°C, -10~-20°C)	32
Unloading Space		for bring in or take out samples	57
Fumigation Rm.		for insect control	10
Mammals Collection Stg.		based on the layout of specimen cabinet (total length of 90m)	323
Birds Collection Stg.		based on the layout of specimen cabinet (total length of 90m)	323
Insect Collection Stg.		based on the layout of specimen cabinet (total length of 180m)	548
Wet Specimen Stg.		based on the layout of specimen cabinet (total length of 300m)	871

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Mollusks Collection Stg.		based on the layout of specimen cabinet (total length of 90m)	323
Processing Rm.	17	based on equipment layout 5rooms × 30m^2 = 150	150
Wet Specimen	2	based on equipment layout	30
Quarantine Rm.		based on equipment layout 5rooms × 11m^2 = 55	55
ID Rm.	5	identification of specimens 5rooms × 32m^2 = 160m^2	160
Specimen Management Rm.	7	management of going in and out for specimen storage 4rooms × 7m^2 = 28m^2 1rooms × 18m^2 = 18m^2	46
Study Rm.		alternative use of 2~3 persons for each room 5rooms × 20m^2 = 100m^2	100
Sub Total			3,057
Seminar Rm.			
Seminar Rm.		80persons × 1.5~2m^2/person = 120~160m^2	150
Projection Rm.		based on equipment layout	10
Sub Total			160
Canteen			
Canteen		55seats × 1.8m^2/seat = 99m^2	100
Kitchen		around 40% of dining space	38
Sub Total			138
Others			2,481
Hall, Corridor, Stair, Stg., Pantry, etc.			
Total			7,863

Outdoor Facilities

Electrical Rm., Generator Rm., Garbage and Incinerator Space	120 m^2
Parking	50cars

Gunung Halimun National Park Headquarters (HQ)

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Administration Block			
Director Rm.	1	including meeting space	20
Expert Rm.	2	including meeting space	23
Administration Rm.	4	4persons × 7m^2/person = 28m^2	28
Chief Rm.	1	1persons × 15m^2/person = 15m^2	15
Meeting Rm.		for director and experts 8persons × 3.2m^2/person = 25m^2	23
Hall, Lavatory Storage, etc.			
Sub Total (1)			166
Research Block			
Field Survey Management Rm.	10	including meeting space 10persons × 7m^2/person = 28m^2	71
Park Management Chief Rm.	1	1person × 15m^2/person = 15m^2	15
Park Utilization Chief Rm.	1	1person × 15m^2/person = 15m^2	15

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Drawings & Computer Rm.		based on equipment layout	29
Laboratory		based on equipment layout	29
Specimen Stg.		for temporary storage of specimen	6
Storage, etc.			
Sub Total (2)			166
Information & Training Block			
Library & Training Rm.		30persons×2.5m^2/person=75m^2	70
Document Stg.		based on layout of bookshelves and carrel	34
Storage, etc.			
Sub Total (3)			139
Guest House			
Bed Rm. A (for 2 persons)		with shower and toilet 1room×20m^2=20m^2	20
Bed Rm. B (for 2 persons)		without shower and toilet 4rooms×14m^2=56m^2	61
Dining Rm.		space for dining and living	43
Kitchen, Lavatory, Shower, etc.			
Sub Total (4)			144
Others (Utility)			
Canteen		12seats×1.8m^2/seat=22m^2	23
Kitchen		based on equipment layout	12
Workshop		for repairing vehicles	24
Generator Rm.		based on equipment layout	19
Corridor, Storage etc.			
Sub Total (5)			110
Total			725

Outdoor Facilities

Pump Space	10 m^2
Parking	7cars

Gunung Halimun National Park Research Station (RS)

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Administration Block			
Administration Rm.	4	4persons×7m^2/person=28m^2	30
Medical Rm.		with 1 bed for emergency	10
Laboratory		based on equipment layout	41
Specimen Stg.		for temporary storage of specimen	12
Lavatory, Shower, Kitchen, Storage, etc.			45
Sub Total (1)			137
Guest House			
Bed Rm. A (for 2 persons)		with shower and toilet 1room×20m^2=20m^2	21
Bed Rm. B (for 2 persons)		without shower and toilet 4rooms×14m^2=56m^2	59

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Dining Rm.		space for dining and living	34
Kitchen, Lavatory, Shower, etc.			23
Sub Total (2)			137
Total			274

Outdoor Facilities

Machine Rm. 14 m^2

Parking 4cars

Nature Conservation Information Center (NCIC)

Room Name	No. of Staff	Calculation Basis and Remarks	Planned Floor Area (m^2)
Administration Zone			
Director Rm.	1	including meeting space	23
Expert Rm.	2	including meeting space	23
Administration Rm., Manager Rm.	2	$15m^2+7m^2=22m^2$	20
Information Training Zone			
Information Hall		entrance hall with function of display of national park	52
Meeting Rm.		14persons × 2.5m^2/person = 35m^2	38
Computer Rm.		based on equipment layout	66
Staff Rm.		5persons × 7m^2/person = 35m^2	30
Chief Rm.		2persons × 12m^2/person = 24m^2	31
Others			
Lavatory, Storage, Corridor, etc.			93
Total			376

Outdoor Facility

Parking 4cars

Floor Area (m^2)

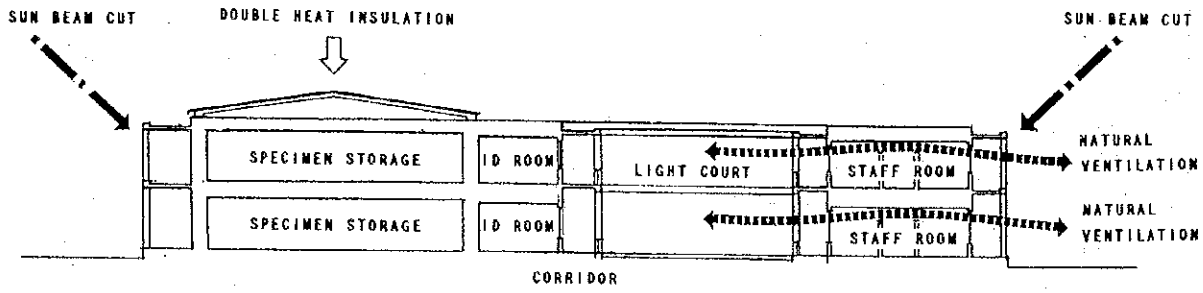
	LIPI-RDCB	PHPA-HQ	PHPA-RS	PHPA-NCIC	Total
Total	7,983	725	288	376	9,372

room is going to be equipped with the private bathroom and toilet (20 square meters); the other rooms will have to rely on the shared bathroom and toilet.

2) Elevation and Sectional plan

a) LIPI's RDCB zoological division facilities

In accordance with the entire plan of the LIPI life science complex, the roofs shall be flat type and the ceilings of the major rooms shall be double-sealed. The height of each floor of each facility is set in accordance with the attached table, based on the ceiling height, the size of the facility space behind the ceiling, and the cross section of the structural beam, etc. of the major rooms. Except the staff room area, the plan has basically adopted the one side corridor type to ensure easy access to natural lighting and natural ventilation, thus making it possible to cope with power failures and shorten the operating time of the air-conditioning equipment.



Sectional View of the Zoological Facility

Also, to the avoid radiation heat and the direct sunlight from external wall surfaces and/or roof surfaces, shading louvers, which play the role of peripheral security grills as well, are installed and sufficient heat insulation layers are secured on the roof surface. Especially, the slabs on the roofs of the specimen storages will be covered further with thatched roofs to ensure an

effective measure against possible leakage and a sufficient height for heat insulation performance. To add a scenic variation and satisfactory symbolic property to its pleasant and rhythmical louver facade, the seminar rooms, the canteens, and the information rooms, which gather a large number of people, will be made slope-roofed or given variations to their heights.

b) PHPA's GHNP HQ

The Gunung Halimun National Park area has a heavy rainfall throughout the year. Therefore, the construction plan will make sure that all the facilities be slope-roofed with deep eaves to facilitate natural ventilation. While the block will have similar-looking facades, they will as a whole differ somehow in their scenic appearances due to differences in their plot levels. On the assumption that the working rooms are not going to be equipped with air-conditioning, an effective design for them is based on the split-block type which allows a large window opening, which is the most important for natural lighting, natural ventilation, and measures against power failures, etc.

c) PHPA's GHNP RS

In this project, this research station is under the severest natural conditions, which include hot and humid climate and much rain. Furthermore, a slope roof with sufficient eaves is used not because it is easy to erect but because the building is based on wooden structure. To minimize reliance on machine facilities, the sufficient window opening and the high-floor type are going to be provided to allow natural lighting and natural ventilation and to enhance the durability of the wooden building. Anti termite treatment will be considered to be done.

d) PHPA NCIC

The roof will be of the flat type, which has been very commonly used for office buildings in the local area in recent years. And the ceilings of major rooms will be double-sealed. As the center building is to be built facing the street, it will be based on the plane planningqq or of the closed middle-corridor type. However, the window openings of the working rooms will be large enough to

secure sufficient natural ventilation and natural lighting. Also, the stair halls are given sufficiently large openings to facilitate circulation of the external air into and out of corridors and halls.

	LIPI-RDCB		PHPA	PHPA	PHPA-NCIC	
	1F	2F	-HQ	-RS	1F	2F
Ceiling Height	2.8m	2.8m	2.7m	2.7m	2.8m	2.8m
Floor Height	4.0m	3.8m	2.9m	2.9m	4.0m	3.8m

3) Structural design

A. Design policies

The basic policies for structural design of this facility are as follows ;

- Superstructure type

  Methods of construction that are general and economical to the actual local area are adopted.

Building Name	No. of Stories	Structural Form
LIPI-RDCB zoological divisions facilities	2 Stories above ground	RC righd Rahmen frame, partially pre-strest concrete for beams
PHPA' GHNP HQ	1 story above ground	RC rigid Rahmen frame
PHPA' GHNP RS	1 story above ground	wooden structure
PHPA' NCIC	2 stories above ground	RC rigid Rahmen frame

- Building site's ground condition and foundation type

a) LIPI's RDCB zoological division facilities

The building site used to be a casava farm. The soil consists of soft silty clay down to about 4 meters from the surface. This layer is followed by the clayey silt and the organic clay. Then, from GL-13 to 17 meters deep, a stable hard clay layer appears. Underneath this, the existence of a solid boulder lay is seen. The allowable bearing capacity of the surface layer foundation is assumed to be about 5 t/m2, based on the soil test results. However, in view of the fact that the planned building is going to occupy a comparatively large space with a heavy load, it is considered difficult to rely on this surface layer as the support foundation. Therefore, the plan will adopt the pile foundation for which concrete pits 30 centimeters square are struck from GL-14 to 17 meters deep into the ground.

b) PHPA's GHNP HQ & RS

Both of the building sites are located in the mountainous areas approximately 1,000 meters above sea level; and their grounds are stable. As the allowable bearing capacity of the ground is expected to be about 10 t/m2 and the building is going to be a comparatively small

scale in either case, the foundation type is planned to be the direct foundation.

c) PHPA's NCIC

The building site is located in an urban district; and the ground consists of a clayey soil layer. Judging from the on-going construction situation in the neighborhood, allowable bearing capacity of the ground is estimated to be somewhere between 8 and 10 t/m2.

- Structural Materials

Most structural materials shall be locally produced ones.

- Concrete (Strength : K 225kg/cm^2)
  Cement : Portland Cement
  Coarse aggregate : River gravel, Crushed stone
  Fine aggregate : River sand
- Reinforcing bar
  Deformed Steel bar : BJT D30 - D10, D13
  BJT D40 - D16, D19, D22, D25
- Steel frame
  H-shaped Steel, Equal angle : SS400

① Principal standards

Design standards for this project will be pursuant to the Indonesian Standards for design loading and structural design of the R.C. members although the design standards of ACI (American building code requirements for reinforced concrete) and Standards of Japan will also be referred to whenever necessary.

- Load and External Force Regulation NI18-1983
  Peraturan Dembebanan Indonesia Untuk Gedung 1983
- Reinforced Concrete Structure Design Standards NI2-1971
  Perturan Beton Bertulang Indonesia
- Design Standard for steel structures (The architectural institute of Japan)
- Design standard for wooden structures (The architectural institute of Japan)

② Design conditions on loads and external forces

Design conditions on loads and external forces are as summarized below for the buildings.

- Dead Load

  Structural materials, Finishing and Things which is fixed to the buildings are properly estimated.

- Live Load

Room	kg/m^2
Roof (Not walk)	75
Roof (Walk)	100
Laboratory, Office, Computer Rm., Canteen, Lecture Rm.,	250
Specimen Storage	1,500
Library Closed Book Storage	400 1,000
Seminar Rm.	500

- Wind Load

  Mainly Wind load (P) will be considered to the design of Roof Supporting Steel.

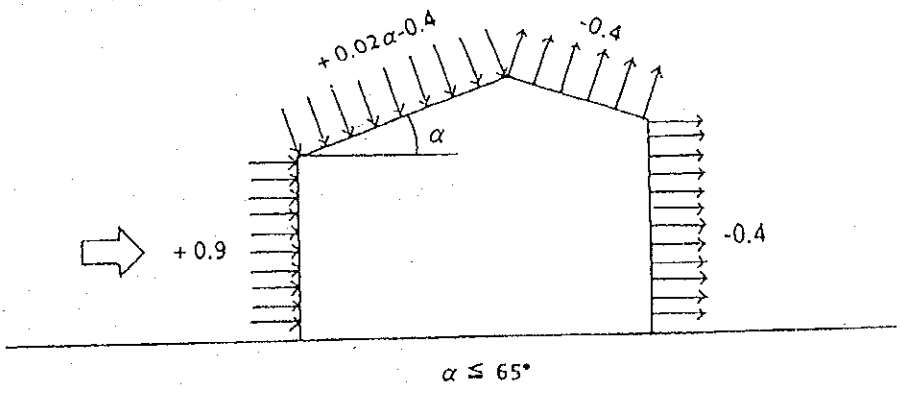
  $P = C \times q \times A$

  where, C : Pressure coefficients

  q : dynamic pressure of wind 25kg/m^2

  A : Surface Area m^2

  Pressure Coefficients are shown below



- Seismic Force

The proposed site is located in Zone 3 on the Seismic Zoning Map shown below.

Basic seismic coefficient will be 0.07 (It will be 0.2 in Japan). The buildings are RC structure and 2 Stories above ground level, thus Seismic force will be shown as below.

$V = C_2^* \times I \times Wt$

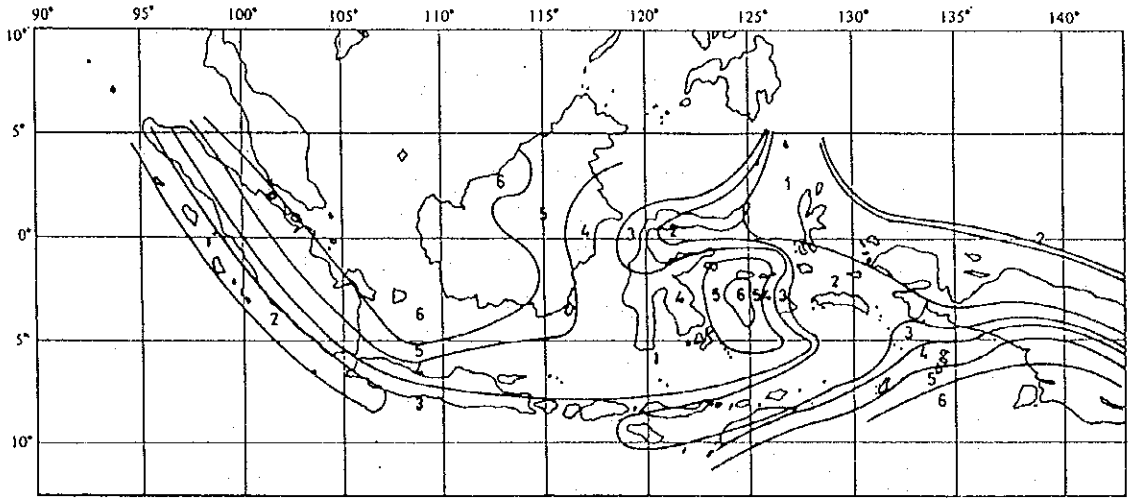
where, V : Base shear

C_2 : Basic seismic coefficient 0.07

I : Importance factor of the building 1.0 (Laboratories)

Wt : Weight of the building

Seismic Zoning Map



Gambar 4.3 Wilayah-wilayah gempa untuk Indonesia

4) Building utilities planning

<Air-conditioning & ventilation facility plan>

Allowing for the air-conditioning grade as well as the hot and humid climate, etc. in Indonesia, a system easy with maintenance and capable of reduced running cost will be planned.

a) RDCB zoological division facility

- Indoor and outdoor temperature /humidity conditions
  - Indoor design conditions

General rooms	:	Temperature	25 C
		Humidity	55 %
Dried specimen storehouses	:		
		Temperature	25 C
		Humidity	50 %
Computing room	:	Temperature	24 C ± 2 C
		Humidity	45 % ± 10 %

- Outdoor design conditions

Temperature	32.2 C
Humidity	82 %

- Air-conditioning system

  Complicated systems whose operation and maintenance are difficult should not be adopted so as to simplify operation and maintenance of the air-conditioning system and to minimize costs. Therefore individual separate type will be adopted for the systems. Emphasis will be put on the utilization of air-cooling separate type package of a small scale. The system will minimize an effect on the facilities in the case of breakdown the equipment.

  Indoor units include the ceiling cassette type, the ceiling open type, the wall type, and the floor type, etc., which will be selected depending on the application, size and design of the room. Considering the comparatively low temperature and high humidity during the rainy reason, the air-conditioning of the specimen storages especially will an air-cooling package combined with a dehumidifier, thus enabling it to cope with dehumidification as well when its load is low. The air conditioning equipment for the computer room will function as

a humidifier as well, thus preventing overdehumidification which occurs in connection with the cooling required as a result of higher heating as well as faulty computer operations deriving from static electricity.

Note : The rooms where air-conditioners will be installed should be specified on the floor plan of each story.

- Ventilation system

  The principle is natural ventilation. However, in the case of the specimen storages, the class-1 ventilating facilities will be installed for the purpose of discharging formalin and/or alcohol, etc. Others include toilets and laboratories, etc. which require ventilation by machines due to their unique functions.

b) GHNP HQ

- Indoor and outdoor temperature conditions
  - Indoor design conditions

General rooms	:	Temperature	25 C
		Humidity	55 %

- Outdoor design conditions

Temperature	29 C
Humidity	90 %

- Air-conditioning system

  In principle, the air-conditioning system will be limited to air ventilation, allowing only the rooms with personal computers to be equipped with a air-cooling separate type package.

- Ventilation system

  Class-3 ventilation facilities will be installed only in the toilets, kitchens, and bathrooms. Natural ventilation will be applied to other places.

c) GHNP RS (research station)

No air-conditioning facilities will be installed at the GHNP research station. And, class-3 ventilation facilities will be installed in the toilet, kitchens, and bathrooms only.

d) NCIC (Nature Conservation Information Center)

- Indoor and outdoor temperature conditions
  - Indoor design conditions

General rooms	:	Temperature	25 C
		Humidity	55 %
Computer room	:	Temperature	24 C ± 2 C
		Humidity	45 % ± 10 %

- Outdoor design conditions

Temperature	32.3 C
Humidity	81 %

- Air-conditioning system
  The air-cooling separate type package will be installed for air conditioning. The system to be installed in the computing room will function as a humidifier as well to prevent static electricity.

- Ventilation system
  Emphasis will be put on the utilization of natural ventilation. However, toilets will be equipped with class-3 ventilation facilities.

<Water supply, sewerage, and sanitation installation system>
While paying sufficient attention to easy maintenance and hygienic aspect of the facilities, the plan adopts equipment in line with Indonesian customs.

a) RDCB zoological division facility

- Water supply facility plan and water supply source
  There are the service pipes from the city water main, on the roads on both sides of the Biotechnology Research Laboratory in the Cibinong Life Science Center. These service pipes are extended by Indonesia to the present building site to use the city water. Furthermore, a well will be dug (by Indonesia) in the building site for emergency use during the dry season.

- Water supply system

  Allowing for reduced water pressure during the dry season, the service pipe is given more generous 40 m/m. Through this pipe, water is stored in the outdoor FRP receiving water tank (14 m3) for about a day's use. The water here is pumped up into the elevated water tank (2.5 m3) by means of a water pump to be then supplied to various locations using the gravitational force. Piping work will be done on the well to supply water from here to the receiving water tank through manual valve switchover.

- Drainage facility plan

  The drainage system will consist of four subsystems dealing with sewage water, miscellaneous waste water, laboratory waste water and rainwater respectively. The sewage water is handled by infiltrated it into the ground after treating it in the sewage water septic tank. The laboratory waste water is introduced into the neutralizing equipment for PH-adjustment and joined with the miscellaneous waste water and treated in its septic tank before being infiltrated into the ground. The rainwater is naturally discharged into the open ditch to be installed along the front road.

- Sanitary fixture plan

  Closet bowls : Shall be of western type.
  Local types are not to be adopted.
  A water faucet will be installed in each booth.
  Urinals : Shall be of wall-mounted stall type.
  Wash basins : Shall be of single tap type. No hot water will be supplied. No soap cases will be installed.

- Fire extinguishing facility

  The fixed non-inflammable gas fire-extinguishing facility adopted in Japan is excellent for specimen and computer rooms because it causes no water damage. However, this type is not adopted in this local area in consideration of the maintenance and handling difficulties, which may inevitably involve danger and considering the affection to the nature conservation. However, in compliance with the local fire

protection code, indoor fire extinguishers will be installed in all the buildings.

- Gas facility
  The city gas pipe at the Biotechnology Research Laboratory will not be extended to be adopted due to the low-pressure. LP Gas will be used for the facility.

b) GHNP HQ

- Water supply facility plan
  - Water supply source
    Water will be supplied from the well to be installed by the Indonesian side.

- Water supply system
  Making use of the differences in height of the building site, an FRP receiving water tank (7 m3) large enough to store one day's water will be installed on a hill higher than the HQ building. Water sent by the well pump will be led into this tank to be then supplied to various locations in the HQ area by means of the gravitational force.

- Drainage facility plan
  Septic tanks will be set up separately to treat the sewage water and the miscellaneous waste water before infiltrated into the ground.

- Sanitary fixture plan

Closet bowls	:	Shall be of western type. Local types are not to be adopted. A water faucet will be installed in each booth.
Urinals	:	Shall be of wall-mounted stall type.
Wash basins	:	Shall be of single tap type. No hot water will be supplied. No soap cases will be installed. Manual mixing type of faucet will be installed in the bathrooms.
Shower	:	Manual mixing type will be installed.

- Hot-water supply facility plan
  Hot-water facilities will be installed only for the bathrooms of the accommodation rooms. In consideration of maintainability and serviceability, the hot-water supply will rely on the hot-water storage type electric calorifier, which is widely used in the local area.

c) GHNP RS

- Water supply facility plan
  - Water supply source
    Water will be supplied from the Chikaniki river.

- Water supply system
  Making use of the differences in height of the building site, an FRP receiving water tank (7 m3) large enough to store one day's water will be installed on a hill higher than the RS building. Water sent by the pump will be led into this tank to be then supplied to various locations in the RS area by means of the gravitational force.

- Drainage facility plan
  Septic tanks will be set up separately to treat the sewage water and the miscellaneous waste water before infiltrated into the ground.

- Sanitary fixture plan

Closet bowls	:	Shall be of western type. Local types are not to be adopted. A water faucet will be installed in each booth.
Urinals	:	Shall be of wall-mounted stall type.
Wash basins	:	Shall be of single tap type. No hot water will be supplied. No soap cases will be installed. Manual mixing type of faucet will be installed in the bathrooms.
Shower	:	Manual mixing type will be installed.

- Hot-water supply facility plan
  Hot-water facilities will be installed only for the bathrooms of the accommodation rooms. In consideration of maintainability and serviceability, the hot-water supply will rely on the hot-water storage type electric calorifier, which is widely used in the local area.

d) PHPA NCIC

- Water supply facility plan
  - Water supply source
  A water pipe will be branched from the city water main buried under the front road on the east side of the site to bring the city water in (construction to be done by the Indonesian side).

- Water supply system
  The water supply pressure is satisfactory all year round and the volume of water used is small. Therefore, water is supplied to various locations in and around the center through direct connection to the tap water.

- Drainage facility plan
  The drainage system will consist of three subsystems dealing with sewage water, miscellaneous waste water and rainwater respectively. The sewage water and miscellaneous waste water are handled by infiltrate them into the ground after treating them in each sewage water septic tanks. The rainwater is naturally discharged into the open ditch installed along the front road.

- Sanitary fixture plan

Closet bowls	:	Shall be of western type. Local types are not to be adopted. A water faucet will be installed in each booth.
Urinals	:	Shall be of wall-mounted stall type.
Wash basins	:	Shall be of single tap type. No hot water will be supplied. No soap cases will be installed.

<Electric facility plan>

The basic policies on electric facilities are implemented based on the following matters :

- Safety for the people using the building and ease of maintenance work.
- Assurance of sufficient powers for research and conservation
- Low running cost expected from easy maintenance

a) RDCB zoological division facility

- Trunk facilities
  - Power facilities

    PT.PLN's 20-KV distribution lines are laid to enable power supply to the zoological division building. The PLN transformer sub-station is set up within the plot to pull in the power. The installed capacity of this facility is estimated to be about 800 KVA. The construction work will be divided as follows: construction of PLN's transformer sub-station and its connection to the items of equipment in the transformer sub-station will be provided by the Japanese side; the construction work for the switch and the leading in to that point will be taken charge of by the Indonesian side. (See the system diagram for further details.)
  - Telephone facility

    At Cibinong's life science center (LSC), 180 telephone lines are made available by the PT TELEKOM INDONESIA, of which 20 lines are for the RDCB and can be brought in from the main line installed in front of the building site. The required construction work will be divided as follows: the cabling and BI board work up to the outdoor branch terminal board in the planned site will be provided of by the Indonesian side; and the following works for the terminal board, the wiring, and the telephone switchboard facility inside the building will be done by the Japanese side.

- Auxiliary power facility

  The power generator of about 400 KVA is going to be installed as a measure for disaster prevention power, minimal load for

research equipment, and minimal load for lighting and air-conditioning in cases of power failures.

- Ordinary power facilities
  - Wiring facilities for electric lamps

- Lighting facilities
  The illumination level varies depending on the IES. However, the illumination plan will aim at reduced running costs based on adequate illumination levels. The types of lighting fixture to be selected will be those which can be locally repaired. Illumination levels are outlined below.

Computer room	:	500 ℓx
Office rooms, research rooms, staff rooms	:	350 to 400 ℓx
Specimen storages	:	200 to 300 ℓx
Corridors, toilets, and machine rooms	:	50 to 100 ℓx

- Receptacle outlet facility
  The receptacle outlets for office rooms, staff rooms, and corridors, etc., will be placed considering their general uses and cleaning purposes, etc. Location of outlets for research rooms will be planned in harmony with the equipment layout. If the power capacity is large, a dedicated distribution board is planned.
  - Main power facilities
    The main lines going out to various systems from the electrical-room's low-voltage switchboard in the building are divided in terms of commercial and emergency uses when carrying out power supply to various distribution boards and power control boards over cable racks and CV cables. The electric modes are as follows ;

Electric light power main-line	:	3-phase 4 lines 380/220 V
Lighting and receptacle circuits	:	single-phase 2 lines 220 V
Power circuits	:	3-phase 3 lines 380 V

The start/stop power control board of air-conditioners, pumps, fans and other items of electrically-driven equipment is installed in each machine room. An alarm panel is installed in the administration office to inform it of any abnormalities in equipment or water levels, etc.

- External lighting facilities
  External lightings are planned to be installed around the building for prevention of nighttime crimes.

- Low-voltagepower facilities
  - Public announcement facility
    Speakers are going to be installed in major rooms, with the main amplifier system in the administration office for purposes of making announcements to people or paging in the building.
  - TV co-watching facility
    Co-watching outlets are installed in various rooms of the building which they are needed. The main antenna for co-watching is planned to be set up on the building roof.

- Disaster prevention facilities
  - Sensors and push-buttons are planned to be used to activate alarm bells with the purposes of detecting fires early and ensuring safety for people. The alarm indicator panel is installed in the administration office.
  - Lightning rod facility
    A lightning conductor is planned to be set up to protect the building from lightning.
  - Emergency illuminating guidance lamp facilities
    Emergency illuminating guidance lamps are to be installed in windowless working rooms to enable people to safely evacuate in power failure.

- Elevator facilities
  An elevator is to be installed to load and unload heavy instruments. Live load capacity is 1,500kg (23 persons).

b) GHNP HQ

- Trunk facilities
  - Power facilities

    PT-PLN's low-tension overhead distribution line, which is laid near the building site, is capable of supplying power of about 40 KVA to this HQ building. The construction work will be divided between Indonesia and Japan as follows. The cabling of the switchboard outside the building up to its primary connection together with the installation of integrating wattmeters will be done by PT-PLN on the Indonesian side. The remaining work from the switchboard on will be carried out by the Japanese side.

- Telephone facility

  Although the existing telephone line is currently available up to near where the planned building site is located, its circuit capacity has reached its limit. However, an application is made, it will take about two months before a line is led in.

- Auxiliary power facilities

  The private power generator of about 20 KVA is going to be installed as a measure for minimal load for research equipment and minimal load for lighting and air-conditioning in cases of power failures.

- Lighting facilities

  The illumination level varies depending on the IES. However, the illumination plan will aim at reduced running costs based on adequate illumination levels. The types of lighting fixture to be selected will be those which can be locally repaired. Illumination levels are outlined below.

Office rooms, research rooms	:	350 to 400 ℓx
Library	:	500 ℓx
Corridors, toilets, and machine rooms	:	50 to 100 ℓx

- Receptacle outlet facility

  The receptacle outlets for office rooms, staff rooms, and corridors, etc., will be placed considering their general uses

and cleaning purposes, etc. Location of outlets for research rooms will be planned in harmony with the equipment layout. If the power capacity is large, a dedicated distribution board is planned.

- Main power facilities

  The main lines going out to various systems from the electrical-room's low-voltage switchboard in the building are divided in terms of commercial and emergency uses when carrying out power supply to various distribution boards and power control boards over cable racks and CV cables. The electric modes are as follows ;

Electric light power main-line	:	3-phase 4 lines 380/220 V
Lighting and receptacle circuits	:	single-phase 2 lines 220 V
Power circuits	:	3-phase 3 lines 380 V

  The start/stop power control board of air-conditioners, pumps, fans and other items of electrically-driven equipment is installed in each machine room. An alarm panel is installed in the administration office to inform it of any abnormalities in equipments or water levels, etc.

- External lighting facilities

  External lightings are planned to be installed around the building for prevention of nighttime crimes.

- Low-voltagepower facilities
  - Public announcement facility

    Speakers are going to be installed in major rooms, with the main system in the administration office for purposes of making announcements to people or paging in the building.
  - TV co-watching facility

    Co-watching outlets are installed in various rooms of the building which they are needed. The main antenna for co-watching is planned to be set up on the building roof.

c) GHNP RS

- Trunkfacilities
  - Power facilities
    Located inside the national park, the RS is not allowed to pull the power in. Therefore, a small-sized normal-service generator with the capacity of 5 KVA is going to be installed to provide the minimally required power.

- Telephone facility
  As with the power, it is not allowed to extend the telephone line into the national park. Therefore, making communications with the HQ office by VHF wireless is under consideration.

- Lighting facilities
  The illumination level varies depending on the IES. However, the illumination plan will aim at reduced running costs based on adequate illumination levels. The types of lighting fixture to be selected will be those which can be locally repaired. Illumination levels are outlined below.

Office rooms, research rooms	:	350 to 400 ℓx
Accommodation rooms	:	200 to 300 ℓx
Corridors, toilets, and machine rooms	:	50 to 100 ℓx

- Receptacle outlet facility
  The receptacle outlets for office rooms, and corridors, etc., will be placed considering their general uses and cleaning purposes, etc. Location of outlets for research rooms will be planned in harmony with the equipment layout.
  - Main power facilities
    The main lines going out to various loads from the electrical light power distribution board for the building.
    The electric modes are as follows ;

Electric light power main-line	:	3-phase 4 lines 380/220 V
Lighting and receptacle circuits	:	single-phase 2 lines 220 V

Power circuits : 3-phase 3 lines
380 V

- External Lighting facilities
  External lightings are planned to be installed around the building for prevention of nighttime crimes.

- Disaster prevention facilities
  - Lightning rod facility
    As lightning is expected to occur often locally, a lightning arrester is planned to be installed on the roof.

d) PHPA NCIC

- Trunk facilities
  - Power facilities
    The low-tension overhead distribution line is laid near the building site, making it possible to pull in the power. The cabling of the lead-in terminal board outside the building up to its primary connection together with the installation of integrating wattmeters will be done by the Indonesian side. The remaining work will be carried out by the Japanese side. The required electric capacity is estimated to be about 25 KVA.

- Telephone facility
  Currently the telephone line is passing overhead in the nearby area and has room for three to four more circuits, which can be pulled into this center. The cabling work up to the lead-in terminal board is going to be carried out by the Indonesian side.

- Lighting facilities
  The illumination level varies depending on the IES. However, the illumination plan will aim at reduced running costs based on adequate illumination levels. The types of lighting fixture to be selected will be those which can be locally repaired. Illumination levels are outlined below.

Office rooms, research rooms	:	350 to 400 ℓx
Computer rooms	:	500 ℓx
Corridors, toilets, and machine rooms	:	50 to 100 ℓx

- Receptacle outlet facility
  The receptacle outlets for office rooms, and corridors, etc., will be placed considering their general uses and cleaning purposes, etc. Location of outlets for research rooms will be planned in harmony with the equipment layout.
  - Main power facilities
    The main lines going out to various loads from the electrical light power distribution board for the building.
    The electric modes are as follows ;

Electric light power main-line	:	3-phase 4 lines 380/220 V
Lighting and receptacle circuits	:	single-phase 2 lines 220 V
Power circuits	:	3-phase 3 lines 380 V

  - External lighting facilities
    External lightings are planned to be installed around the building for prevention of nighttime crimes.

5) Construction material plan

The selection of materials for facilities construction should be suitable for the climate and natural features of the local area and lay stress on adopting materials and construction methods that have taken root in the local area. The uses of each room are accommodated and its cost effectiveness, durability and maintainability are put into consideration when planning on the following materials for construction ;

<Exterior finishing materials>

a) LIPI-RDCB zoological division facility
The exteriors of the surrounding facilities are mostly covered with ceramic tiles. Finishing materials were selected keeping in mind a good harmony with these buildings and a fine unity in the

sense of grades. As for the exterior, spray tiles are used together with brick tiles as the basis to maintain a sense of unity in the grades and assure sufficient durability, which in turn will result in producing an view full of repose and stability. Sloped roofs such as those for collection storages, seminar rooms and canteen are going to be metallic roofing materials excellent in stopping water. Aluminum sashes will be used for windows in consideration of maintainability and confidentiality of the building. Louvers with the dual purposes of burglar prevention and shading are installed on the surfaces of peripheral shading walls. Insect net doors are not set up except in laboratories.

b) GHNP HQ

The exterior of the building will be covered with spray tiles excellent in durability and workability. For slanted roofs, the asphalt single roofing finish, etc. superior in durability and workability will be used aimed at an appearance in tune with the serene local mood. For window sashes, those made of aluminum will be adopted for ease of maintenance. Some louver doors were installed side by side to prevent burglars as well as to give a variation to the appearance. In addition, for the guesthouses used at nighttime, insect net doors are also installed.

c) GHNP RS

Taking the natural conditions of the building site into account, the siding-wood weather-resistant painting finish, which is excellent in workability, is going to be applied thus creating an appearance in harmony with the wooden structure of the building. The slanted roof uses the same materials as those for the HQ office building. Window sashes are also going to be wooden with only the guesthouses fitted with insect net doors. Such factors as eave lengths, white-ant countermeasures, and ease of maintenance sufficient for improved durability of the wooden structure are secured.

d) PHPA NCIC (Nature Conservation Information Center)

The building exterior will be tiled in line with the grades of office buildings in general. The roof water-proofing will be based on the

urethane method, which excels in weather resistance. Aluminum sashes will be used for the windows for the purpose of maintainability. As this building here is not going to be used often at night, no insect net doors will be put up.

<Interior finishing materials>

For interior finish-up of each of the facilities and rooms, the required materials will be selected to suit the required functions after considering each character. Finishing up major rooms is shown on the following pages.

	Room Name	Floor	Wall	Ceiling	Comments on Selection
LIPI-RDCB Zoology	Office Room, Laboratory, Staff Room, Study Room	Ceramic Tile	Paint	Rockwool Acoustic Board	Durability, Hygenic
	Director Room, Meeting Room	Tile Carpet	Wood, Cloth	Rockwool Acoustic Board	Upper Grade Staff, Use by visitors
	Computer Room	OA Floor, Tile Carpet	Paint	Rockwool Acoustic Board	Special Utilization
	Specimen Storage	Plastic Tile	Calcium Silicate Board	Calcium Silicate Board	Special Utilization
	Seminar Room	Wooden Parquet	Wood, Cloth	Rockwool Acoustic Board	Acoustic, Durabiriy
	Entrance Hall, Information	Local Stone	Local Stone, Paint	Wood	Creation of Atmosphere
	Canteen	Local Stone	Spray Tile	Wood	Creation of Atmosphere
	Corrider etc.	Terrazzo Block	Spray Tile	Calcium Silicate Board, Paint	Durability, Easy Maintenance
PHPA-HQ	Office Room, Laboratory, Drawing & Computer Room	Ceramic Tile	Paint	Rockwool Acoustic Board	Durability, Hygenic
	Director Room, Meeting Room	Wooden Parquet	Cloth	Rockwool Acoustic Board	Durability
	Library & Training Room	Wooden Parquet	Wood, Paint	Acoustic Wood	Acoustic, Durability
	Bed Room	Wooden Parquet	Paint	Gypsum Board, Paint	Durability, Comfortability
PHPA-RS	Office Room, Laboratory	Plastic Sheet	Wood	Wood	Durability, Workability
	Bed Room	Flooring Board	Wood	Wood	Durability, Workability
PHPA-NCIC	Office Room	Ceramic Tile	Paint	Rockwool Acoustic Board	Durability, Hygenic
	Director Room, Meeting Room	Tile Carpet	Cloth	Rockwool Acoustic Board	Durability
	Computer Room	OA Floor, Tile Carpet	Paint	Rockwool Acoustic Board	Special Utilization
	Entrance Hall	Local Stone	Local Stone, Paint	Rockwool Acoustic Board	Creation of Atmosphere
Common	Laboratory, Pantory	Ceramic Tile	Ceramic Tile	Calcium Silicate Board	Easy Cleaning, Durability
	Machine Room	Dust Proof Paint	Glasswool Board	Glasswool Board	Sound Arrestor
	Storage	Plastic Tile	Paint	Calcium Silicate Board	Durability

(3) Equipment plan

1) Research equipment

The LIPI has requested two types of microbiological research equipment; 140 types of zoological science research equipment; a database system; a geographical information system; and a computer system containing the image processing system. The PHPA has requested 27 types of basic research equipment; 21 types of survey equipment; 21 types of audio-visual equipment; 12 types of drawing tools and car repairing tools; 6 vehicles; 12 motorbikes; and a computer system. The equipments requested by the LIPI are large in number because the existing ones are very few and aged. The equipments to be provided were determined based on the priority order of A to C given by the LIPI and in coordination with the number and sizes of rooms to be affiliated with the specimen storages to be newly built. In meeting the requests from the PHPA for the HQ and the RS, both of which are completely newly built, the equipments to be provided were determined based on the priority order of A to C (as with the LIPI) and in coordination with the accommodation capacities of the newly-built HQ and RS.

The laboratory tables and reagent racks, etc. to be installed in each research room are included in the facility construction because they require coordination with the facilities to be built.

2) Information equipment

① LIPI

The LIPI is currently working toward database compilation, using three PC by GEF's aid. The software in use is dBASE-III. The main purpose of the database being compiled is specimen management, thus differing from the database to be compiled with the requested information processing system. The database intended to be compiled on the requested system is for general purposes, thus making it necessary to include not only the information on specimens but also the information on changes in land utilization as a type of related map information and environmental information. Therefore, what is planned here as a

system is to construct an information processing system based on the database system, with the geographical information processing and the image analysis function. An immediate purpose of this plan is to give priority to compiling a database on the GHNP to form a system that will, in the future, spread as a model to other national parks and areas. The RDCB is estimated to be holding about 25,000 GHNP-related specimens, with the rise in the coming two years expected to be 10,000. Furthermore, as part of the work of sorting out the existing specimens, it is expected that 500,000 specimens will be compiled into a database in the coming 10 years. Therefore, the planned capacity of the database system is 15 to 20 GB for the storing of those data. Regarding unified database compilation, a database committee, with the IBRD's GEF playing the leading role, is conducting research on its format, etc. in this regard, which is planned to be adopted gradually. The configuration of the information processing system settled by LIPI is shown in Figure 2-3-1.

② PHPA

Bogor's PHPA HQ has a map division, which needs to be staffed by 30 persons. This division has recently introduced PC-based GIS system, for which four persons to be in charge are receiving trainings at the time of February 1995. Others include the PHPA headquarters, where a computer system was introduced 3 years ago based on a EWS-link between the geographical information system and the image analysis system, for a British-aided vegetation research work on the Kalimantan Barat. This system had separated the geographic information system afterward, before June 1995, and united with the above mentioned map section with the increasing of nine trainees. This system, which will be considered in the plan, is going to be owned by the PHPA after the end of the project. Not many days have passed by since the GHNP was set up thus the data beginning with specimens are not yet in a good and complete order. However, as many more specimens are anticipated at this park than the 4,000 specimens at the nearby GPNP (Gunung Pangrango National Park), this system will be mainly used for management of the GHNP for the time being. The computer system requested by the PHPA is a

EWS-link of the geographical information system and the image analysis system. It is a prior subject to plan for the input of drawings accumulated by the present and those effective use, therefore the geographical information system of EWS control is planned to be introduced into the NCIC, and as one of the user of database of RDCB's biodiversity information network which will be planned to be constructed, it will be planned to play a function of information exchange not merely play a function of a geographical information processing system of the PHPA. The configuration of the information processing system settled by PHPA is shown in Figure 2-3-2.

The list the equipments to be provided to the LIPI and the PHPA as well as the reasons for having decided on them is shown in Table 2-3-2 and Table 2-3-3.

Figure 2-3-1 Information Processing System Configuration for LIPI

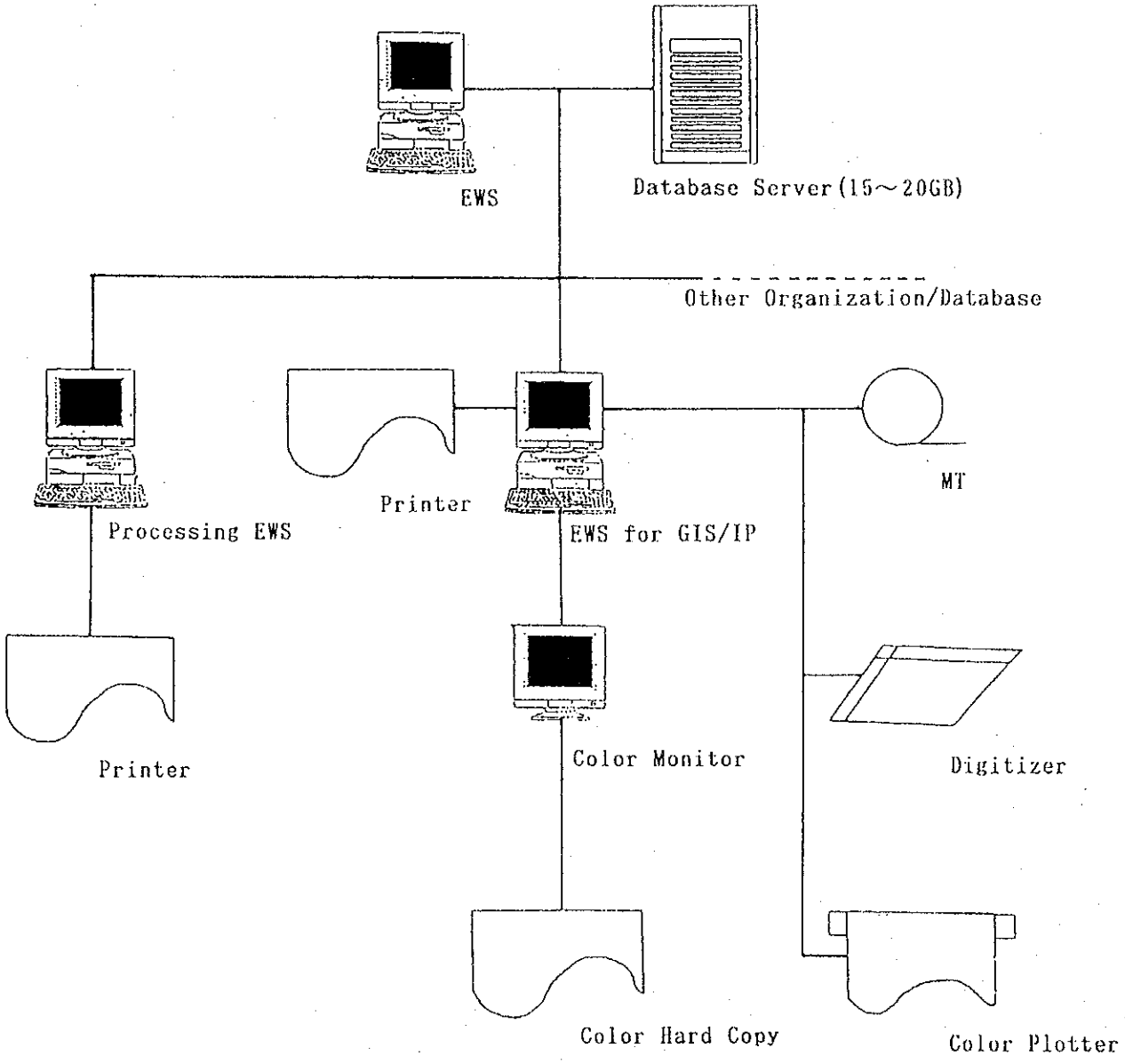


Figure 2-3-2 Information Processing System Configuration for PHPA

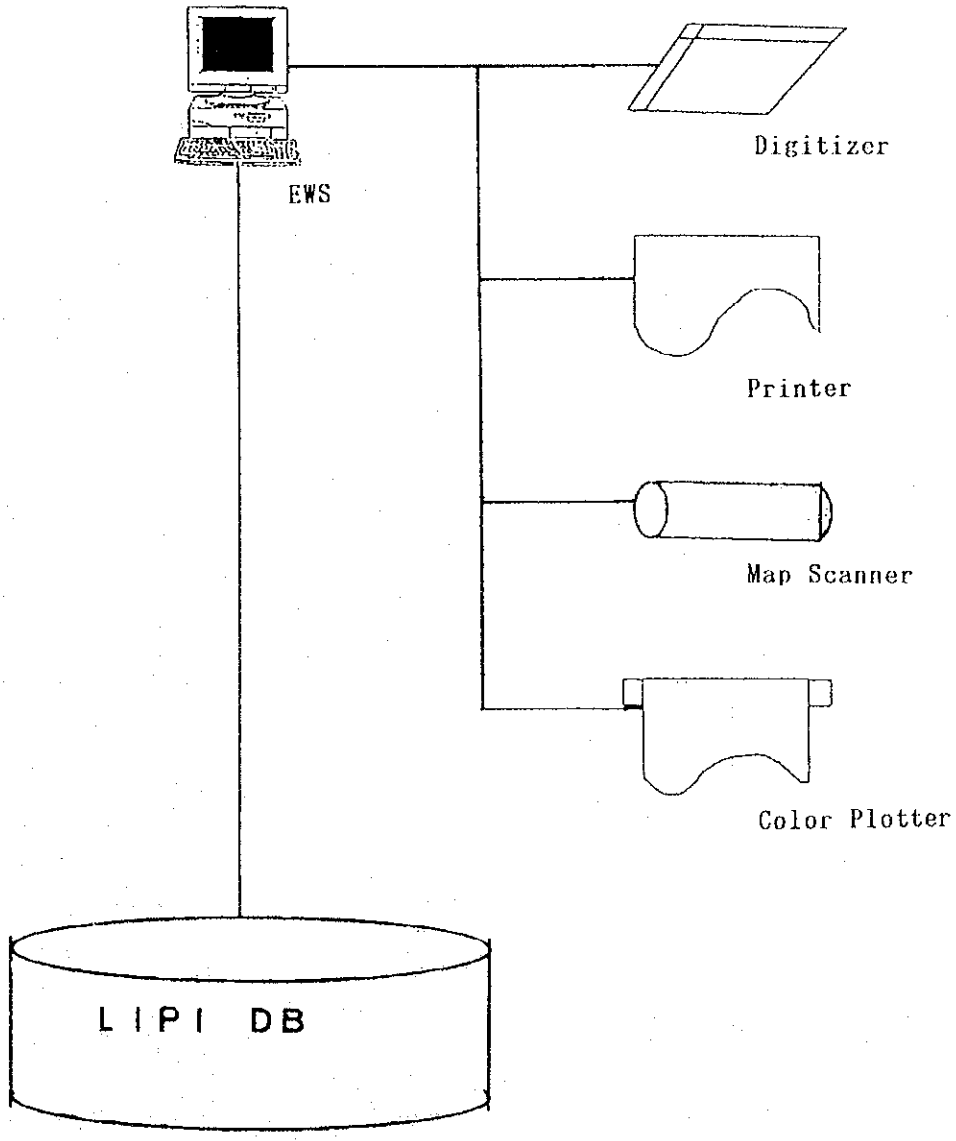


Table 2-3-2 The reason of equipment selection for LIPI

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The Reason of Selection of Equipment
A-1-1	Sample mill1	1 (A)	1	To crush mainly solid materials for making samples for chemical analyses. Equipment for general use.
A-1-2	Blender	1 (C)	1	To crush mainly soft and wet materials for making samples for chemical analyses. Equipment for general use.
A-1-3	Kjeltec	1 (A)	1	To analyze protein and nitrogen of samples. Necessary equipment for these kind of analyses.
A-1-4	Hydrolizing unit and Soxtec system HT6	1 (A)	1	To measure total fat of samples. Necessary equipment for these kind of analyses.
A-1-5	Fibretec	1 (C)	0	Existing equipment is available.
A-1-6	Digestion system	1 (C)	1	To make the samples for chemical analyses by decomposition of materials with acid under high temperature. Necessary equipment to use Kjeltec.
A-1-7	Moisture analyzer	1 (C)	0	To measure moisture content of sample. Possible to measure by sand bath and balance instead of this equipment.
A-1-8	Automatic titrator	1 (C)	0	Equipment for precise titration. Occasional use.
A-1-9	Amino acid analyzer	1 (A)	0	To analyze amino acid for identification of chemical structure of protein. However, operation and maintenance cost is too high to keep. Liquid chromatography and atomic absorption photometer are to be supplied instead of this equipment.
A-1-10	Shaker	1 (B)	1	General equipment to dissolve, separate and culture tissue.
A-1-11	Magnetic stirrer	1 (C)	1	To mix reagents. Comparatively heavy use.
A-1-12	Calorimeter	1 (C)	0	Existing equipment is available.
A-1-13	Birds/mammals Calorimetry	1 (B)	0	Not possible to purchase because of under development.
A-1-14	Didital pH meter	1 (C)	1	To measure pH of solution.Comparatively heavy use.
A-1-15	Water distilling apparatus	1 (B)	1	To make distilled water which is indispensable for chemical analyses.
A-1-16	Eye wash post	1 (A)	0	To wash eyes which are suffered by acid. Equipment for emergency use.
A-1-17	Spectrophotometer	1 (A)	1	Necessary for detecting minor elements in material. Remarks;spectrofluoressence meter will be supplied instead of this equipment.
A-1-18	Refrigerator	1 (B)	1	Necessary for preserving samples and reagents.
A-1-19	Deep freezer	1 (B)	1	Necessary for preserving samples and reagents in medium term.
A-1-20	Dry freezer1	1 (A)	1	Necessary for preserving samples and reagents in long term.
A-1-21	Electronic balance	1 (A)	1	Necessary for weighing samples and reagents.
A-1-22	Auto Muffle furnace	1 (C)	1	To reduce materials to ash. Necessary for spectrofluorecense meter.

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The Reason of Selection of Equipment
A-1-23	Body comp. analyzer	1 (C)	0	Existing equipment is available.
A-1-24	Homogenizer	1 (C)	1	To make samples without crushing protoplasms and cells Important equipment in physiology.
A-1-25	Liquid chromatography	-	1	In substitution for amino acid analyzer (A-1-9)
A-1-26	Atomic absorption photometer	-	1	In substitution for amino acid analiyzer (A-1-9)
A-1-27	Ultrasonic cleaner	-	1	Necessary for cleaning of experimental tools.
A-1-28	Two stage water distilling apparatus	-	1	To make distilled water which is indispensable for chemical analyses.
A-2- 1	Stainless gas cocker	1 (A)	0	Necessary equipment fo sample preparation. It will be supplied with kitchen table.
A-2- 2	Food processor	1 (C)	1	To crush and mix materials. Heavy use.
A-2- 3	Microwave	1 (A)	1	Mainly for heating materials. Heavy use.
A-2- 4	Refrigerator	1 (C)	1	Necessary for preserving samples and reagents.
A-2- 5	Electronic balance	1 (B)	1	Necessary for weighing samples and reagents.
A-2- 6	Electronic balance	1 (B)	1	Necessary for weighing samples and reagents.
A-2- 7	Ultrasonic cleaner	-	1	Necessary for cleaning of experimental tools.
A-2- 8	Dry box	-	1	Necessary for keeping optical instrument.
A-3- 1	Microscopes(with camera lucida)	1 (A)	1	Necessary for observing of microbes and cells.
A-3- 2	Incubator CO2	1 (C)	1	Necessary for culturing anaerotic microbes.
A-3- 3	Laminar airflow	1 (A)	1	Necessary for preparing samples in clean environment.
A-3- 4	Autoclave	1 (C)	1	Necessary for sterrilizing tools.
A-3- 5	Pregnancy ultrasound scanner	1 (C)	1	To observe not only bird pregnancy but also skeltal structure. Heavy use.
A-3- 6	Centrifuge 20,000rpm	1 (A)	1	To extract virus, mitochondrias and cellmembrances.Heavy use.
A-3- 7	Laparascopy	1 (A)	1	Important equipment to distiguish sex of bird specimens.
A-3- 8	Electroejaculator	1 (A)	0	Important to collect sperm for genetic study. Occasional use.
A-3- 9	Artificial insemination	1 (B)	1	Necessary for collecting genes.
A-3-10	LNG Rapid semenfreezer	1 (C)	0	To rapidly freeze sperm for preservation. The stable supply of liquid nitrogen is necessary for operation.
A-3-11	Preservative freezer	1 (B)	1	To preserve collected sperm.
A-3-12	Slide warmer	1 (C)	1	Necessary for studying genes.
A-3-13	Sperm examination plate	1 (C)	1	Necessary for studying genes.
A-3-14	Sperm counter	1 (C)	1	Necessary for studying genes.
A-3-15	Artificial vagina	1 (C)	1	Necessary for collecting sperm for genes study.
A-3-16	Dissecting instruments	1 (C)	1	Necessary for treating animal and bird specimens.

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The Reason of Selection of Equipment
A-3-17	Temperature and humidity meter(including hygrothermometer)	1 (C)	1	Necessary for monitoring room conditions.
A-3-18	Dual scale thermister thermometer	1 (C)	1	To measure body temperature of birds and animals.
A-3-19	Hygrometer	1 (C)	1	To measure humidity. Heavy use.
A-3-20	Radiation thermometer	1 (A)	1	To remotely measure radiated temperature of birds and animals.
A-3-21	Surface thermometer	1 (A)	1	To measure body temperatures of birds and animals.Heavy use.
A-3-22	Electrocardiogram	1 (A)	0	To record cardiogram of animals. Occasional use.
A-3-23	Luxmeter	1 (C)	0	Existing equipment is available.
A-3-24	Digital count pen	1 (C)	0	To count the number of cultured germs.
A-3-25	Hemogrobimeter	1 (C)	0	Occasional use.
A-3-26	Hematocrit centrifuge	1 (C)	0	To separate blood cells. Because of occasional use. Refrigerated compact centrifuge is to be supplied instead of this equipment.
A-3-27	Hamacrytometer	1 (C)	0	Existing equipment is available.
A-3-28	Blood calorimeter	1 (C)	0	To observe blood cells. Occasional use.
A-3-29	Haugh meter	1 (C)	1	To measure egg size.
A-3-30	Egg shell meter	1 (C)	1	To measure thickness of eggshells.
A-3-31	Egg meter	1 (C)	1	To measure protein of albumine.
A-3-32	Egg shape factor meter	1 (C)	1	To measure the factors of egg shape.
A-3-33	Electrostimulation	1 (A)	0	To collect bird's sperm. Only exists trial piece in a US unversity.
A-3-34	Dry box	-	1	Necessary for keeping optical instrument.
A-3-35	Ultrasonic cleaner	-	1	Necessary for cleaning of experimental tools.
A-3-36	Refrigerated compact centrifuge	-	1	Necessary for extracting blood cells.
A-4-1	Refrigerator	1 (A)	1	Necessary for preserving samples and reagents.
A-4-2	Microcentrifuge	1 (C)	0	Existing equipment is available.
A-4-3	Dry bath	1 (A)	1	To dry materials and samples. General equipment.
A-4-4	Autoclave	1 (B)	1	Necessary for sterrilizing tools.
A-4-5	DNA Thermal cycler	1 (C)	0	Existing equipment is available.
A-4-6	Agarose submarine gel apparatus	1 (A)	1	Not to be requested.
A-4-7	Electrophoresis power supply	1 (A)	1	Not to be requested.
A-4-8	Laminar flow hood with UV option	1 (A)	1	Necessary for preparing samples in clean environment.
A-4-9	Freezer	1 (C)	1	Necessary for keeping samples and materials. General equipment.

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The Reason of Selection of Equipment
A-4-10	Eppendorf repeating pippetor	1 (C)	0	Necessary for precisely titrating. Occasional use.
A-4-11	Incubator 37℃	1 (A)	1	To culture germs and cells. General equipment.
A-4-12	Microscope + photogrametry	1 (A)	1	Necessary for observing of microbes and cells.
A-4-13	Swinging back centrifuge	1 (A)	1	To extract virus, mitochondria and cell membrances.
A-4-14	Water bath	1 (C)	0	Existing equipment is available.
A-4-15	Orbital shaker	1 (A)	1	To die gel for electropholesis. General equipment.
A-4-16	Phast system	1 (A)	1	To measure phast.
A-4-17	Polaroid camera with UV transmitter	1 (C)	0	Existing equipment is available.
A-4-18	Microwave	1 (A)	1	General equipment.
A-4-19	Balance	1 (C)	1	Necessary for weighing samples and reagents.
A-4-20	Slab gel electricapparatus	1 (C)	1	Important for genes study.
A-4-21	Tall mighty smallvertical slab unit	1 (C)	1	Important for genes study.
A-4-22	Dry box		1	Necessary for keeping optical instrument.
A-4-23	Ultrasonic cleaner		1	Necessary for cleaning of experimental tools.
A-5-1	Analytical balance	4 (A)	4	Necessary for treating reagents.
A-5-2	Microanalytical balance	1 (C)	1	Necessary for treating reagents.
A-6-1	Personal computer	2 (B)	2	Multi-purpose equipment.
A-6-2	Laser printer	2 (B)	2	To be supplied with computer.
B-1	Scanning electron microscope	1 (A)	1	To observe microstructures of insects. Necessary equipment in this branch.
B-2	Stereo binocular microscope + camera lucida	1 (B)	1	To observe microstructures of insects. Necessary equipment in this branch.
B-3	Compound binocular microscope + camera lucida	1 (A)	1	To observe microstructures of insects. Necessary equipment in this branch.
B-4	Zoom stereo microscope	1 (A)	1	To observe microstructures of insects. Necessary equipment in this branch.
B-5	Dissecting microscope	1 (C)	1	Necessary to treating small insects.
B-6	Deep freezer	1 (A)	1	Preservation of samples and reagents. Necessary equipment.
B-7	Digital balance	1 (B)	1	Necessary for weighing reagents and samples.
B-8	Spring balance	1 (C)	1	Necessary for weighing samples and specimens.
B-9	Dissecting kit	1 (C)	1	Necessary for treating specimens.
B-10	X-ray	1 (A)	1	To observe microstructures of insects, birds and small animals.
B-11	Computer with printer	2 (B)	2	General equipment.
B-12	Photocopy machine	1 (A)	1	To make photocopies of documents. General equipment.

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The Reason of Selection of Equipment
B-13	Taxidermy set	1 (C)	0	Possibe to be substituted by dissecting kit.
B-14	Oven	1 (C)	1	To dry samples.
B-15	Dry box	-	1	Necessary for keeping optical instruments.
C-1-1	Reflector parabola	1 (A)	0	To collect the voice of birds and animals. However, this is not generally used in recent. Ultrasound (C-1-6) is also used for this purpose. Composed of two instruments listed below.
C-1-2	Cassette recorder	1 (A)	1	To record the voices of birds and animals.
C-1-3	Sonograph(with printer)	1 (A)	0	Not possible to purchase because of specially made to order.
C-1-4	Video player	1 (B)	1	To observe ecology of animals which is recorded by videocamera.
C-1-5	Radio telemetry	1 (C)	0	Numbers and specifications are not clear.
C-1-6	Ultrasound	1 (B)	1	Necessary for collecting animals sound and observing bat ecology.
C-1-7	GPS(with battery + charger)	6 (A)	6	Necessary for fixing geometrical position in the field.
C-1-8	Portable water quality meter	1 (A)	1	Necessary for field survey.
C-1-9	Digital data recorder	-	1	In substitution for monograph (C-1-3)
C-3-1	Dark room equipment	1 (A)	1	Manual type equipment is to be supplied for easy maintenance.
C-3-2	Sink and drainboard	1 (A)	1	Necessary for developing films. General use.
C-3-3	Drawing desk	1 (A)	1	Necessary for drawing maps. General equipment.
D	Incinerator	1 (A)	1	Necessary for treating various wastage.
C-2-1	Database system	1set (A)	1set	The system is composed of two sub-systems of the database sub-system and GIS/Image processing system.
	EWS (Engineering Work Station) Data base server Page printer Software		2 1 1 1	
C-2-2	GIS/Image processing system	1set (A)	1set	
	EWS Digitizer Color plotter Page printer MT drive Color monitor Color hard copy Software UPS (10kVA) +transformer		1 1 1 1 1 1 1 1 1	Countermeasure for power failure.

Table 2-3-3 The reason of equipment selection for PHPA

Research Equipment

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The Reason of Selection of Equipment
P-1-1	Erlenmeyer glass	20 (A)	20	Convenient for researchers to have available in H/Q used as general test and analytical instrument.
P-1-2	Microscope	5 (A)	5	Convenient for researchers to have available in H/Q used as general test and analytical instrument. Ordinary microscope is to be installed.
P-1-3	Electrical oven	2 (A)	2	Convenient for researchers to have available in H/Q used as general treating instrument of specimens.
P-1-4	Dry box	4 (A)	4	Convenient for researchers to have available in H/Q used as general test and analytical instrument.
P-1-5	Soil tester	2 (A)	2	Convenient for researchers to have available in H/Q used as general test and analytical instrument.
P-1-6	Analytic balance	2 (A)	2	Convenient for researchers to have available in H/Q used as general test and analytical instrument.
P-1-7	German type insect net	2 (A)	2	Convenient for researchers to have available in H/Q used as field survey instrument.
P-1-8	Insect collecting case	2 (A)	2	Convenient for researchers to have available in H/Q used as field survey instrument.
P-1-9	Collecting bag	2 (B)	2	Convenient for researchers to have available in H/Q used as field survey instrument.
P-1-10	Animal cage	2 (A)	2	Convenient for researchers to have available in H/Q used as field survey instrument.
P-1-11	Sample bottle (180ϕ x 240H)	50 (A)	50	Convenient for researchers to have available in H/Q used for preservation of specimens.
P-1-12	Incubator	2 (B)	0	Not necessary to prepare because of no need of tissue or germs culture.
P-1-13	Refrigerator	4 (A)	4	To preserve samples and reagents. Necessary equipment.
P-1-14	Stem clipper	2 (B)	2	Convenient for researchers have available in H/Q used for preservation of specimens.
P-1-15	Dry cold storage	2 (B)	2	Convenient for researchers for preservation samples and reagents.
P-1-16	Microtome	4 (B)	0	Not necessary to be prepared without electron microscope.
P-1-17	pH meter	5 (A)	5	Portable type is covenient in field survey.
P-1-18	Power supply	4 (A)	4	Necessary for stabilizing voltage fluctuation. which use AC and have AC/DC converter.
P-1-19	Hot plate	4 (C)	4	Necessary to treat plant specimens.
P-1-20	Hygrometer	4 (A)	4	Desirable to prepare as a survey instrument.

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The reason of Selection
P-1-21	Calliper	4 (B)	4	Desirable to prepare as a measuring instrument.
P-1-22	Stereoscope	2 (B)	2	To stereoscopically observe the aerophotographs. Convenient for researchers for survey.
P-1-23	Interval timer	4 (B)	4	Convenient for researchers to have prepared in H/Q for teatment of specimens and survey.
P-1-24	Plant press	8 (A)	8	Convenient for researchers to have prepared in H/Q for treatment of plant specimens.
P-1-25	Herbariu folder	8 (A)	8	Desirable to be prepared for plant specimen treatment.
P-1-26	Electronic balance	2 (B)	2	Desirable to be prepared for measuring samples. Enough to install ordinary balance.
P-1-27	Storage cabinet	2 (A)	2	Convenient for researchers to havee prepared in H/Q for preservation of specimens and instrument.

Survey Equipment

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The reason of Selection
P-2-1	Hagameter	5 (A)	5	Desirable to be prepared as a survey instrument.
P-2-2	Binocular	5 (A)	5	Necessary to be prepared as a survey instrument and for national park watching.
P-2-3	Thermometer	5 (A)	5	Desirable to be prepared as a survey instrument.
P-2-4	Compass	5 (A)	5	Necessary to be prepared as a survey instrument and for national park watching.
P-2-5	Clinometer	5 (A)	5	Necessary to be prepared as a survey instrument and for national park watching.
P-2-6	Luxmeter	5 (B)	5	Convenient to be prepared as a survey instrument.
P-2-7	Theodolite	3 (B)	3	Convenient to be prepared as a survey instrument.
P-2-8	Diameter tape	4 (A)	4	Convenient to be prepared as a survey instrument.
P-2-9	SAR equipment	2 (A)	2	Necessary to be prepared as a survey instrument and for national park watching.
P-2-10	Altimeter	5 (A)	5	Convenient to be prepared as a survey instrument.
P-2-11	Barometer	5 (A)	5	Convenient to be prepared as a survey instrument.
P-2-12	Anemometer	5 (A)	5	Convenient to be prepared as a survey instrument.
P-2-13	55mm camera set	5 (A)	3	Convenient to be prepared as a survey instrument and for national park watching. However, two set changes to water proof cameras according to PHPA's request.
P-2-14	400mm telescope lens	2 (B)	2	Convenient to be prepared as a survey instrument and national park watching.
P-2-15	50-300mm zoom lens	2 (A)	2	Convenient to be prepared as a survey instrument and for national park watching.
P-2-16	28mm wide lens	2 (B)	2	Convenient to be prepared as a survey instrument and for national park watching.
P-2-17	Tripod	2 (B)	2	Convenient to be prepared as a survey instrument and for national park watching.
P-2-18	Video shooting system	2 (C)	2	Two SVHS handy type cameras with rechargeable batterys, tripods and bags are to be supplied.
P-2-19	Tent	10 (B)	10	Convenient to be prepared as a survey instrument and for national park watching.
P-2-20	Battery + charger	3 (B)	0	GPS includes battery and charger.
P-2-21	GPS	3 (B)	3	Convenient to be prepared as a survey instrument.
P-2-22	35mm water proof camera	-	2	Necessary and convenient for surveying in the rainy season.

Audio Visual Equipment

No. of Equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The reason of Selection of Equipment
P-3-1	Video projector	2 (A)	1	To be supplied with 100-inch flat screen.
P-3-2	inch flat screen	2 (A)	1	One screen is to be supplied due to the width of the installed room.
P-3-3	SP U-matic video cassette	2 (A)	0	No system conformity to other video equipment. Video editing system is to be supplied.
P-3-4	VHS VTR	2 (A)	1	General VHS VTR equipment is to be supplied.
P-3-5	Amp.	2 (A)	1	General VHS VTR amplifire is to be supplied.
P-3-6	Speaker system	2 (A)	1	General audio visual equipment is to be supplied.
P-3-7	Dynamic microphone	2 (A)	2	General audio visual equipment is to be supplied.
P-3-8	Video shooting system	2 (B)	2	Hi-8 handy type video cameras are to be supplied.
P-3-9	Battery charger	2 (C)	2	To be supplied with video camera.
P-3-10	Tripod/dolly/carring bag	2 (B)	2	To be supplied with video camera.
P-3-11	Slide box	2 (A)	2	To be supplied with 35mm slide projector.
P-3-12	Tape deck	2 (B)	1	General audio visual equipment is to be supplied.
P-3-13	Sound system	2 (C)	0	It is included in P-3-5, P-3-6 and P-3-7.
P-3-14	Overhead projector	2 (A)	2	General audio visual equipment is to be supplied.
P-3-15	35mm Slide projector	4 (A)	4	General audio visual equipment is to be supplied.
P-3-16	35mm Film projector	2 (B)	0	Movie films are rapidly disappearing recently and 35mm film projector is difficult to maintain.
P-3-17	16mm Film projectpr	2 (A)	1	Because movie films are rapidly disappearing, proper number of supply is one.
P-3-18	20-inch TV set	2 (B)	2	One TV is connected to video amplifier.
P-3-19	Disc antenna	3 (C)	0	PHPA must prepare the equipment to receieve satellite broadcasting.
P-3-20	Amp.	2 (B)	0	It is included in P-3-5.
P-3-21	Wireless	4 (C)	2	To be supplied with tuner and antenna.
P-3-22	Video editing system	-	1	Necessary for editing video records.

Other Equipment

Name of equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The reason of selection of Equipment
P-4-1	Personal computer r and printer	4 (A)	4	Multi-purpose equipment. To be prepared with instrument against voltage fluctuation.
P-4-2	Laptop/notebook computer	2 (B)	2	ditto
P-4-3	Electrical planimeter	4 (A)	4	Necessary to handle maps.
P-4-4	Drawing desk	2 (A)	2	Heavy use in mapping section.
P-4-5	Drawing tools	2 (A)	2	To be supplied with drawing desk.
P-4-6	Generator	4 (A)	0	Included in the building work.
P-4-7	Handy tansceiver	15 (A)	15	Necessary to be prepared as a survey instrument and for national park watching.
P-4-8	Rig	2 (A)	2	Necessary for preparing as a urgent communication instrument.
P-4-9	Wookshop equipment	2 (A)	2	Necessary for maintaining cars and motorcycles which patrol the national park area.
P-4-10	Jet pump	2 (A)	0	Purpose and specidication are not defined.
P-4-11	Airphone	2 (A)	2	Telephone machine with interphone will be supplied.
P-4-12	VHF antenna	2 (A)	0	Abandon installation because of poor information to communicate by this antenna.

Vehicle

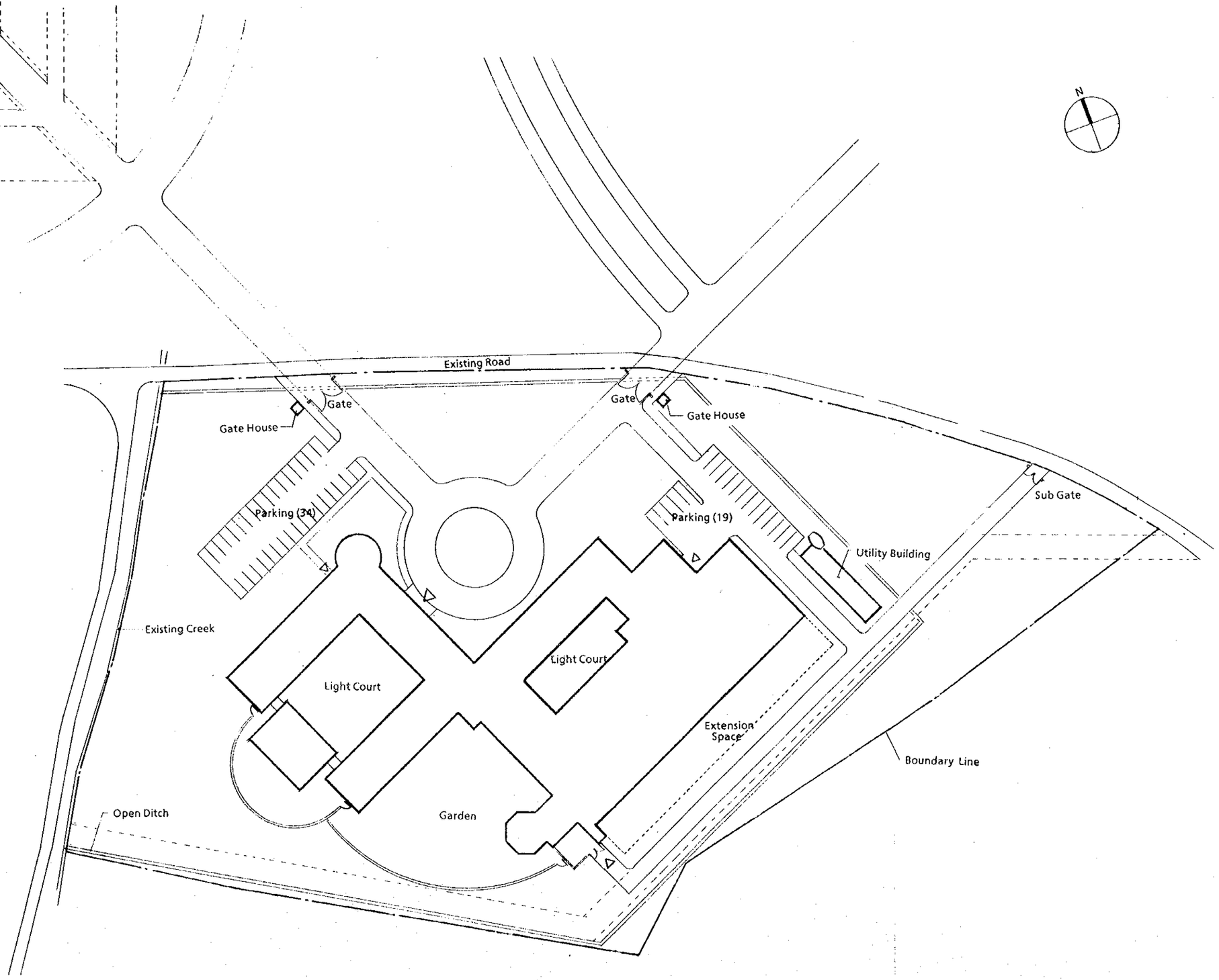
Name of equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The reason of selection of Equipment
P-5-1	Car	6 (A)	4	Four Wheel Drive cars are necessary to patrol the national park area.
P-5-2	Motorcycle	10 (A)	6	Necessary for patroling the national park area. 125cc class motorcycles are to be supplied.

NCIC

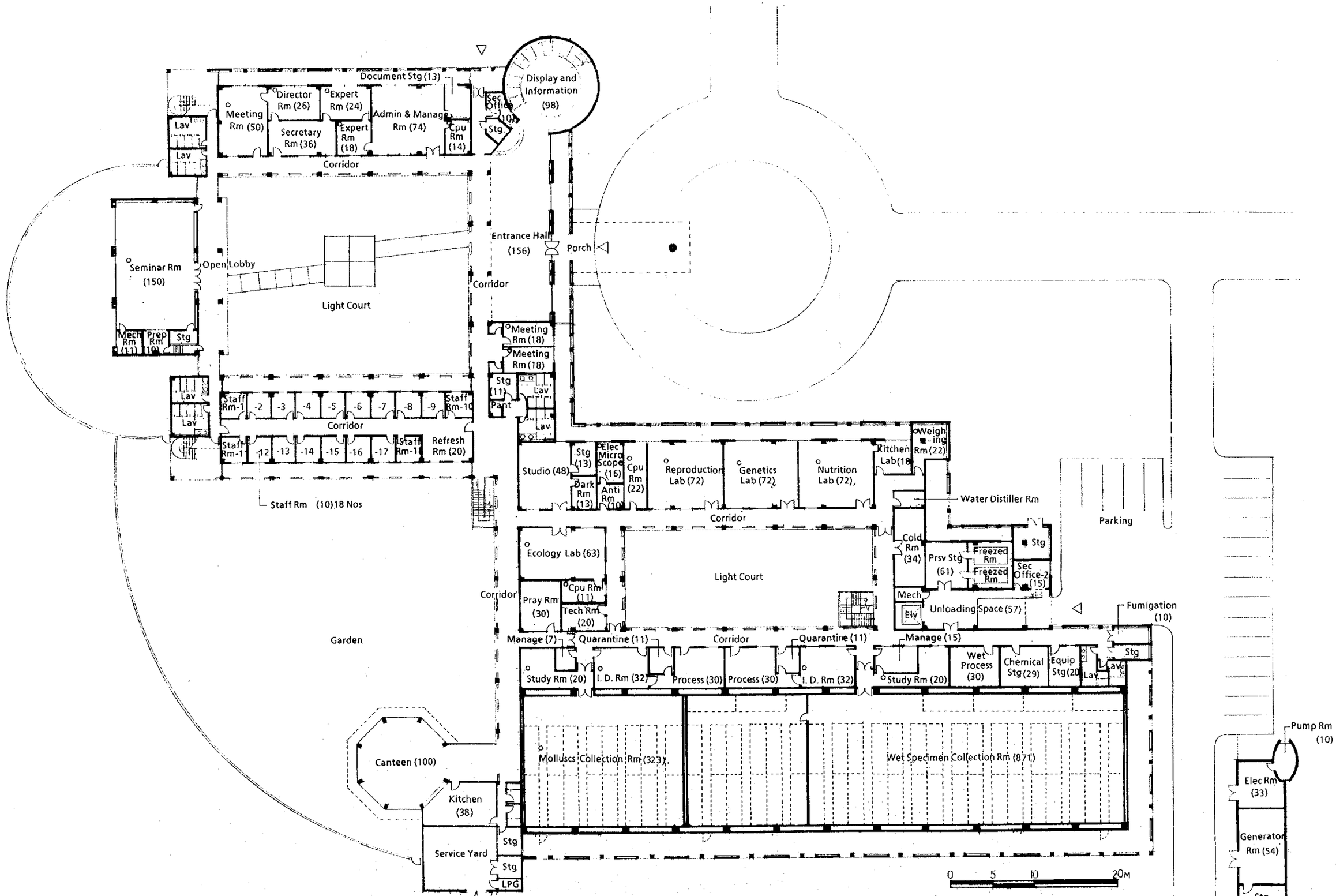
Name of equip.	Name of Equipment	Requested No. (Priority)	No. of Supply	The reason of selection of Equipment
	GIS System	1 (A)	1	Effective for the management of national park.
N-1	EWS (Engineering Work Station)		1	
N-2	Digitizer		1	
N-3	Image scanner		1	
N-4	Color plotter		1	
N-5	Page printer		1	
N-6	UPS		1	
N-7	GIS software		1	

Drawing List

01	LIPI-RDCB Zoological Building	Site Plan
02	LIPI-RDCB Zoological Building	1st Floor Plan
03	LIPI-RDCB Zoological Building	2nd Floor Plan
04	LIPI-RDCB Zoological Building	Elevation
05	LIPI-RDCB Zoological Building	Section
06	PHPA Headquarters Building	Site Plan & Plan
07	PHPA Headquarters Building	Elevation
08	PHPA Headquarters Building	Elevation & Section
09	PHPA Research Station Building	Site Plan & Plan
10	PHPA Research Station Building	Elevation & Section
11	PHPA NCIC Building	Site Plan & Plan
12	PHPA NCIC Building	Elevation
13	PHPA NCIC Building	Section
14	LIPI-RDCB Zoological Building	Infrastructure Line
15	PHPA Headquarters Building	Infrastructure Line
16	PHPA Research Station Building	Infrastructure Line
17	PHPA NCIC Building	Infrastructure Line
18	LIPI-RDCB Zoological Building	Equipment Layout-1
19	LIPI-RDCB Zoological Building	Equipment Layout-2
20	LIPI-RDCB Zoological Building	Equipment Layout-3
21	LIPI-RDCB Zoological Building	Equipment Layout-4
22	LIPI-RDCB Zoological Building	Equipment Layout-5
23	LIPI-RDCB Zoological Building	Equipment Layout-6
24	PHPA NCIC Building	Equipment Layout



特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BUILDING	図面番号 01
			担当	SITE PLAN 1 : 1,000	設計番号



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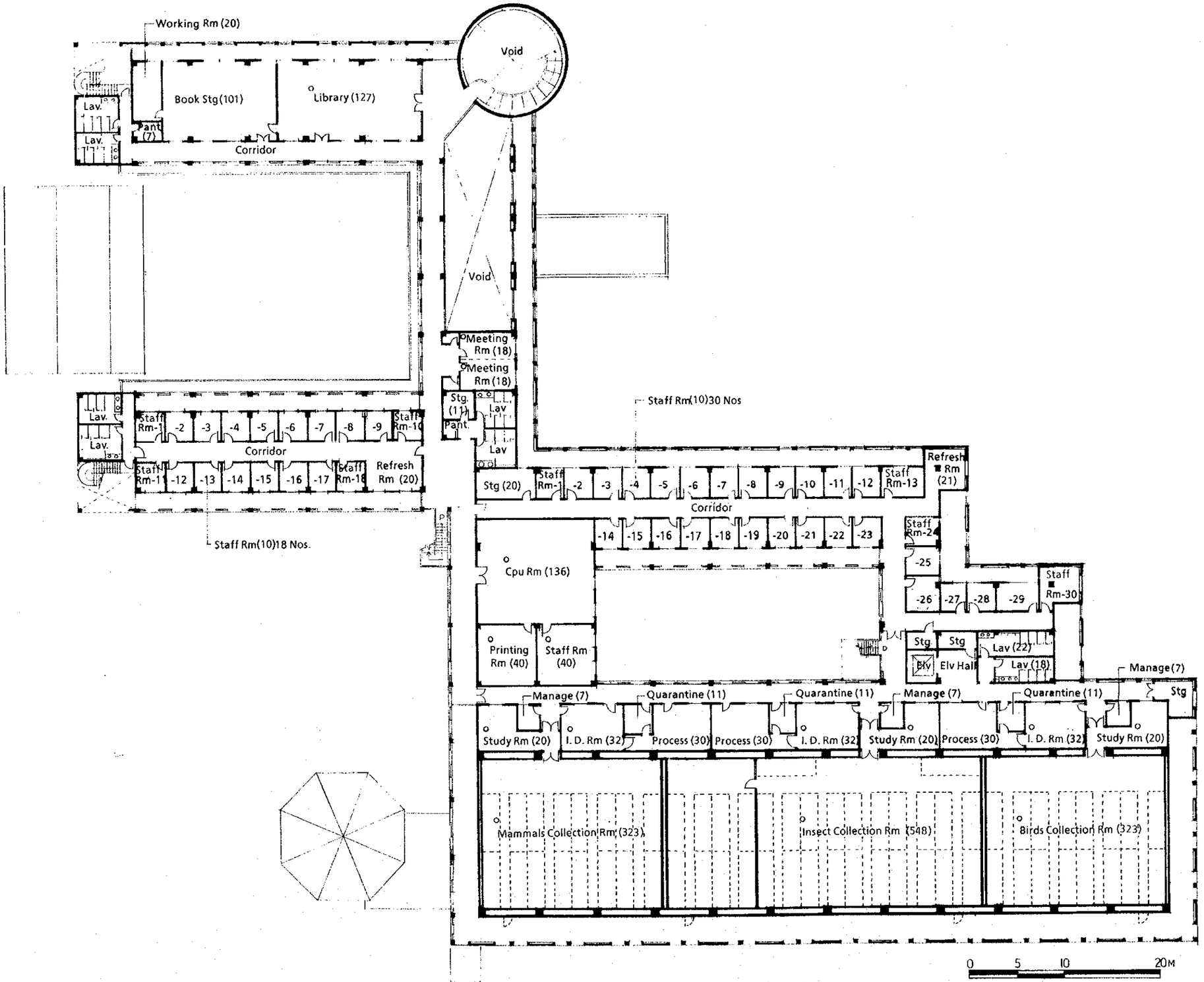
				1ST FLOOR PLAN 1 : 400	



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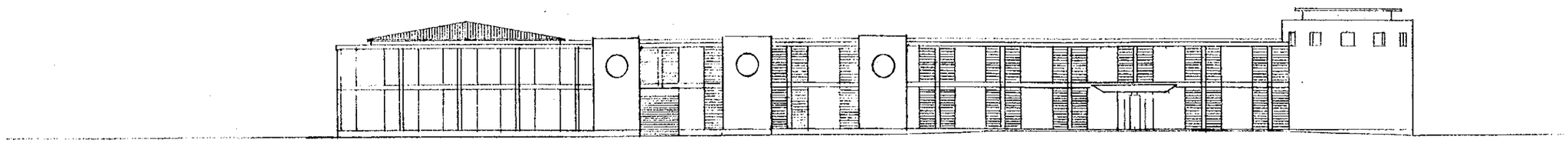
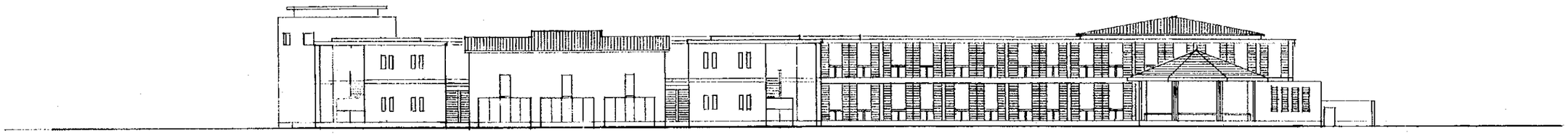


EAST SIDE



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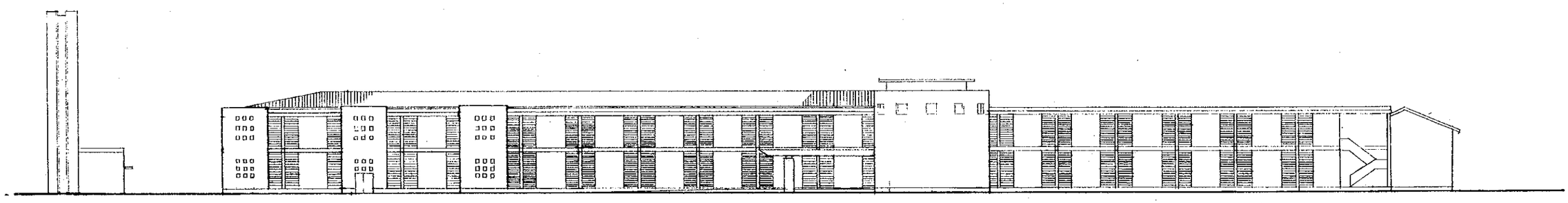
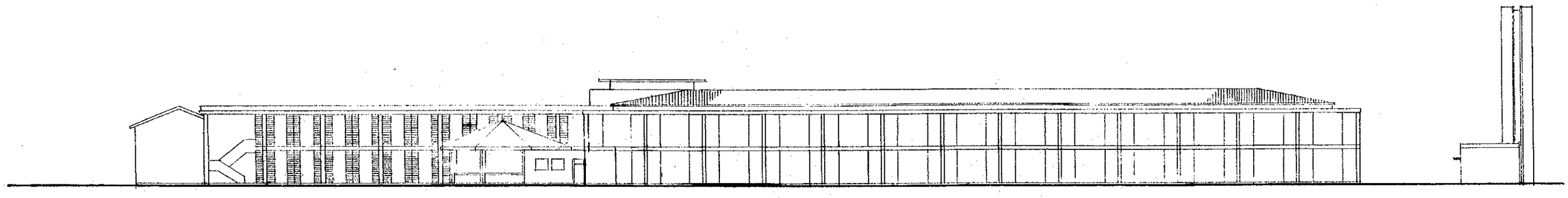
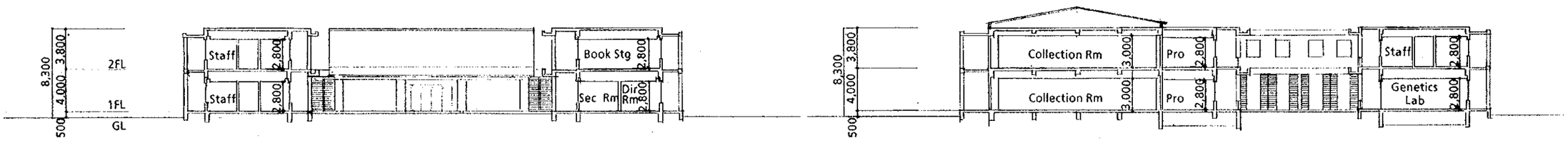


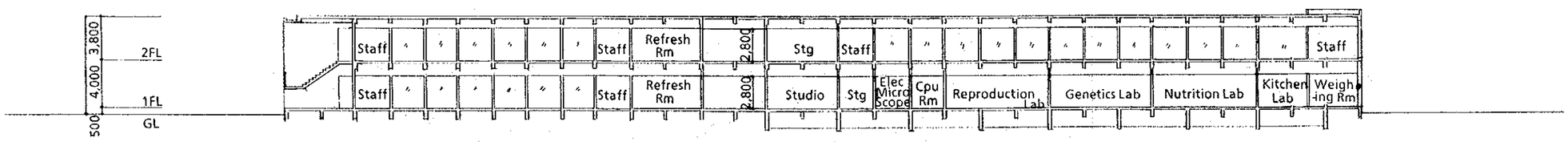
NORTH SIDE



SOUTH SIDE

特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BLDG	図面番号 04
			担当	ELEVATION 1 : 400	設計番号





特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BLDG.	図面番号 05
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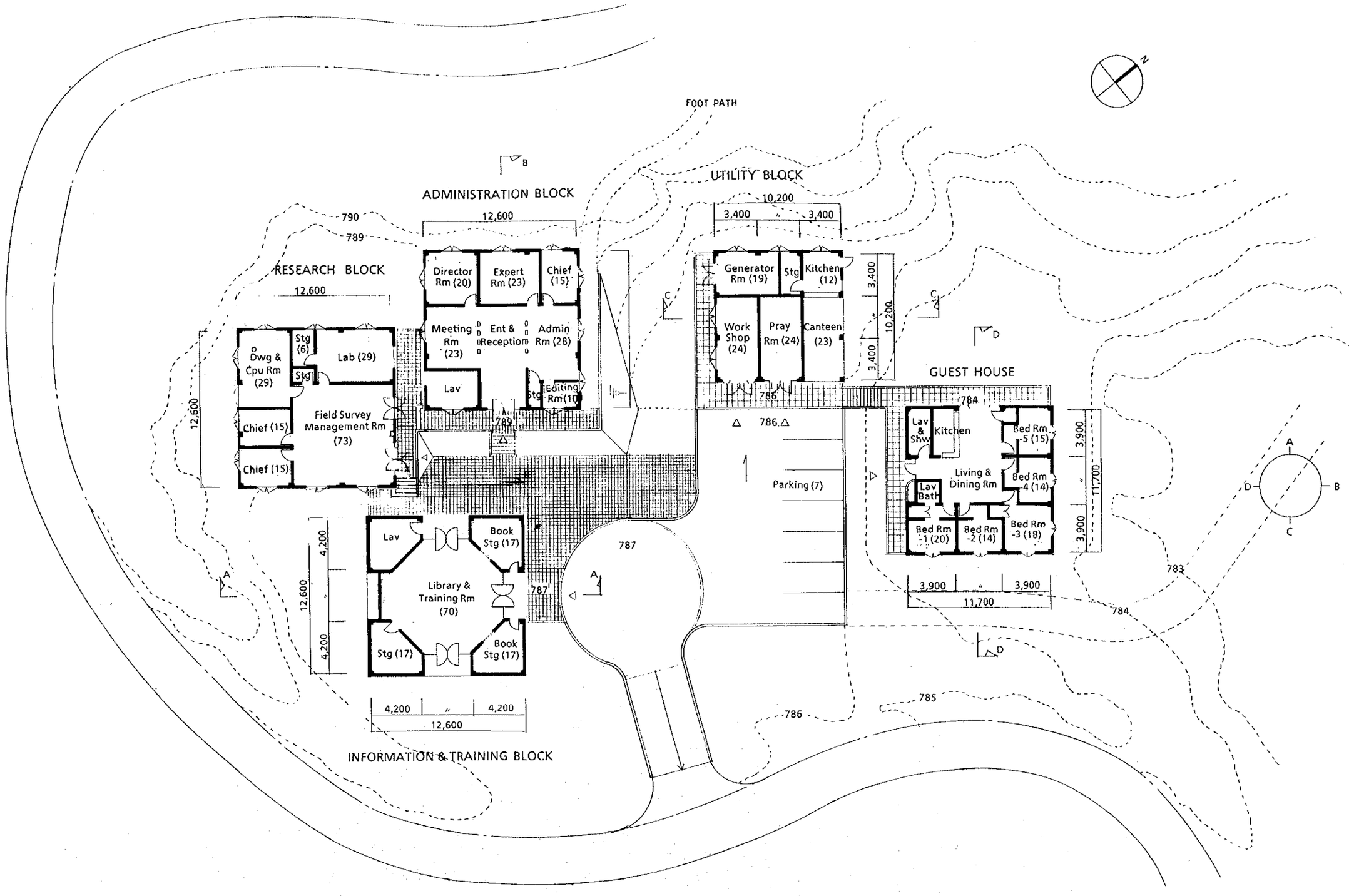

特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA HEADQUARTER BLDG		図面番号 06
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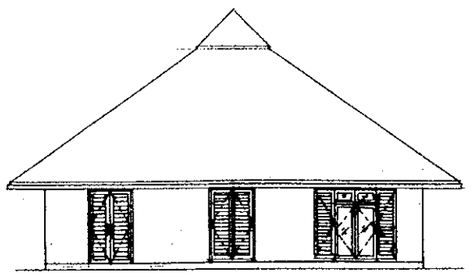
ADMINISTRATION BLOCK



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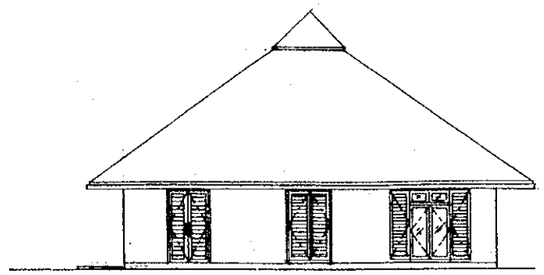

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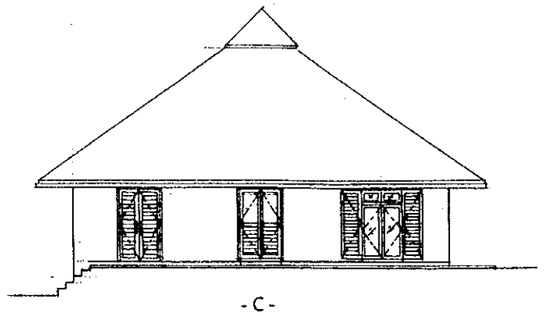

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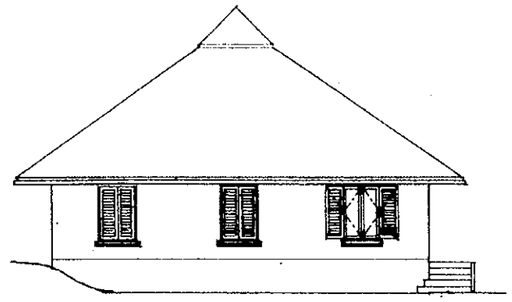

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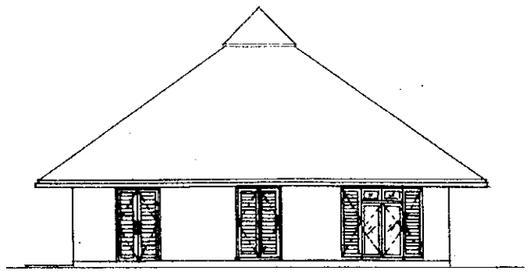
RESEARCH BLOCK



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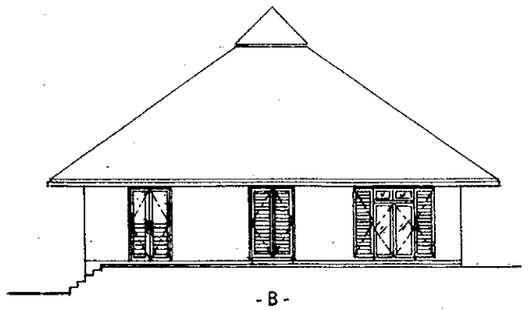

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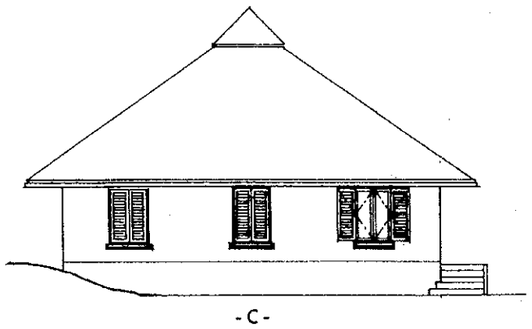

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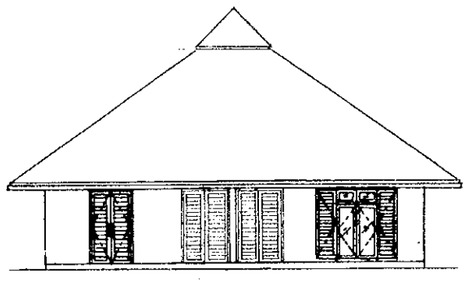

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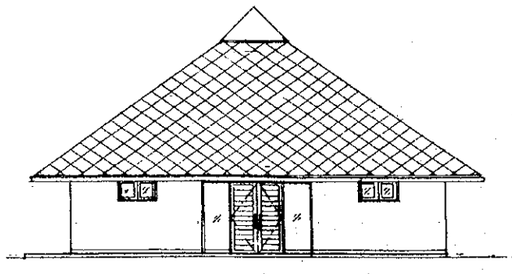
INFORMATION & TRAINING BLOCK



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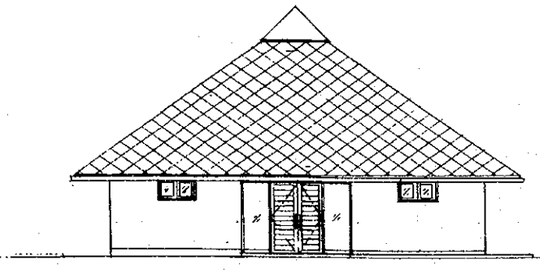

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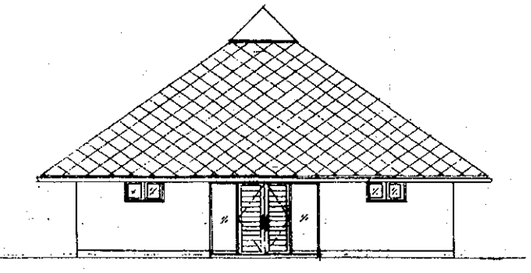

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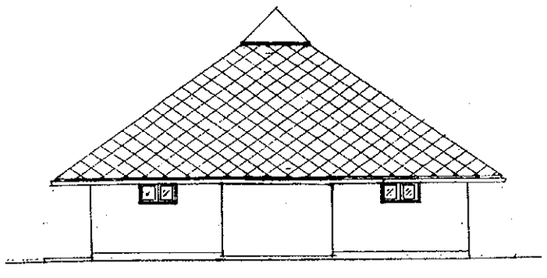
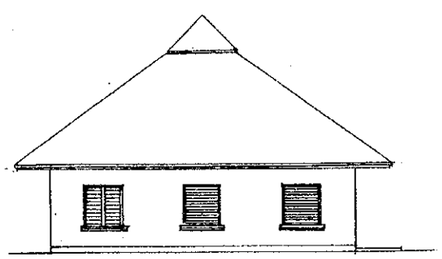


-D-

特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA HEADQUARTER BLDG	図面番号 07
			縮尺	ELEVATION 1 : 200	設計番号

UTILITY BLOCK



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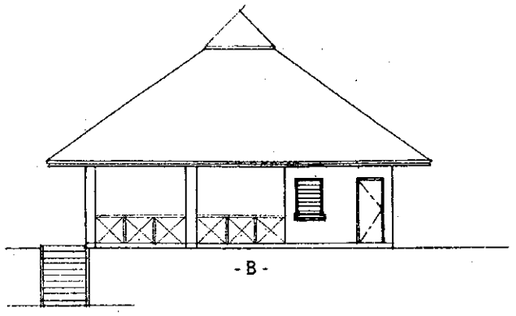

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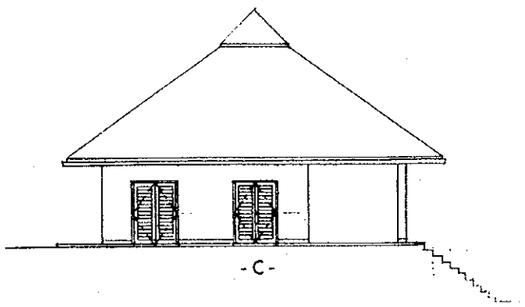

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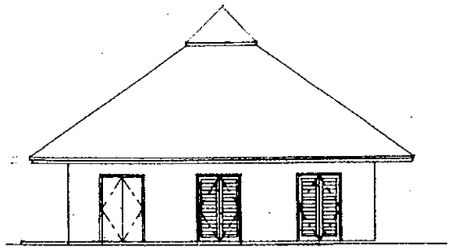

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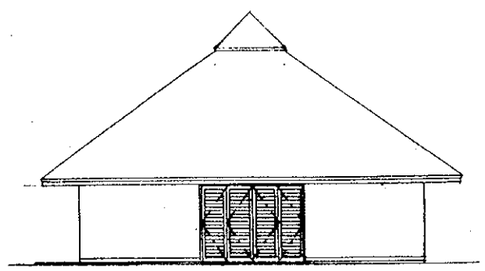
GUEST HOUSE



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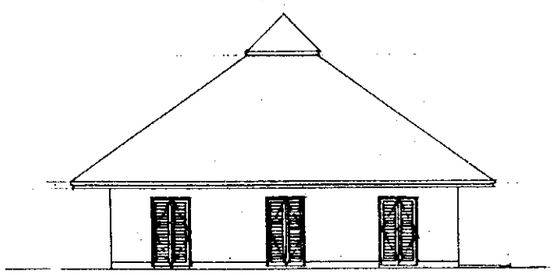

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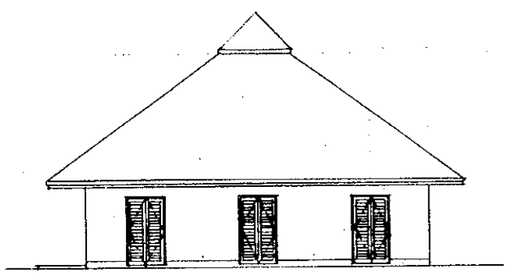

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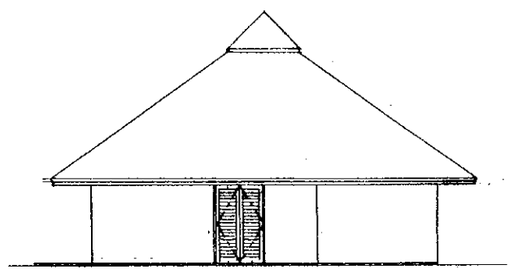

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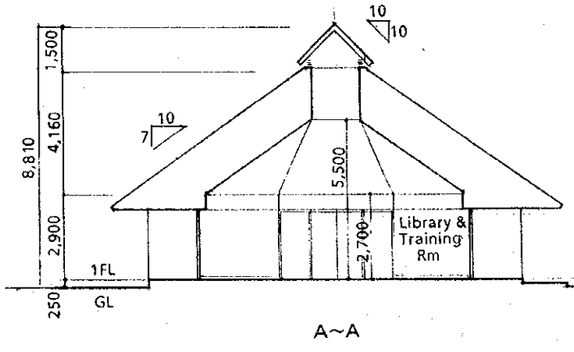

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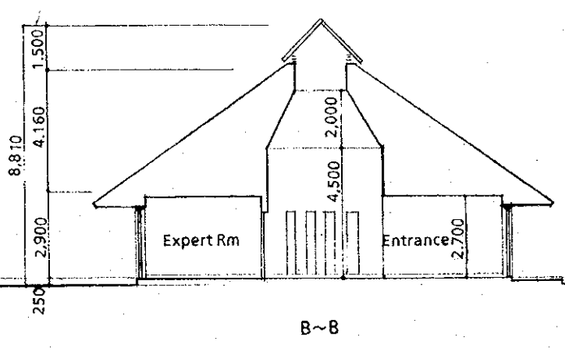

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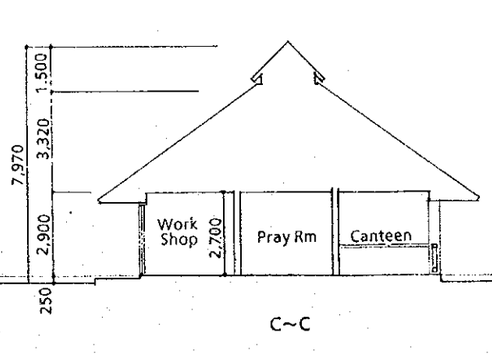

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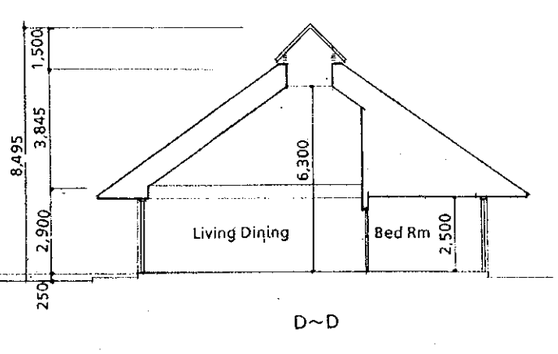

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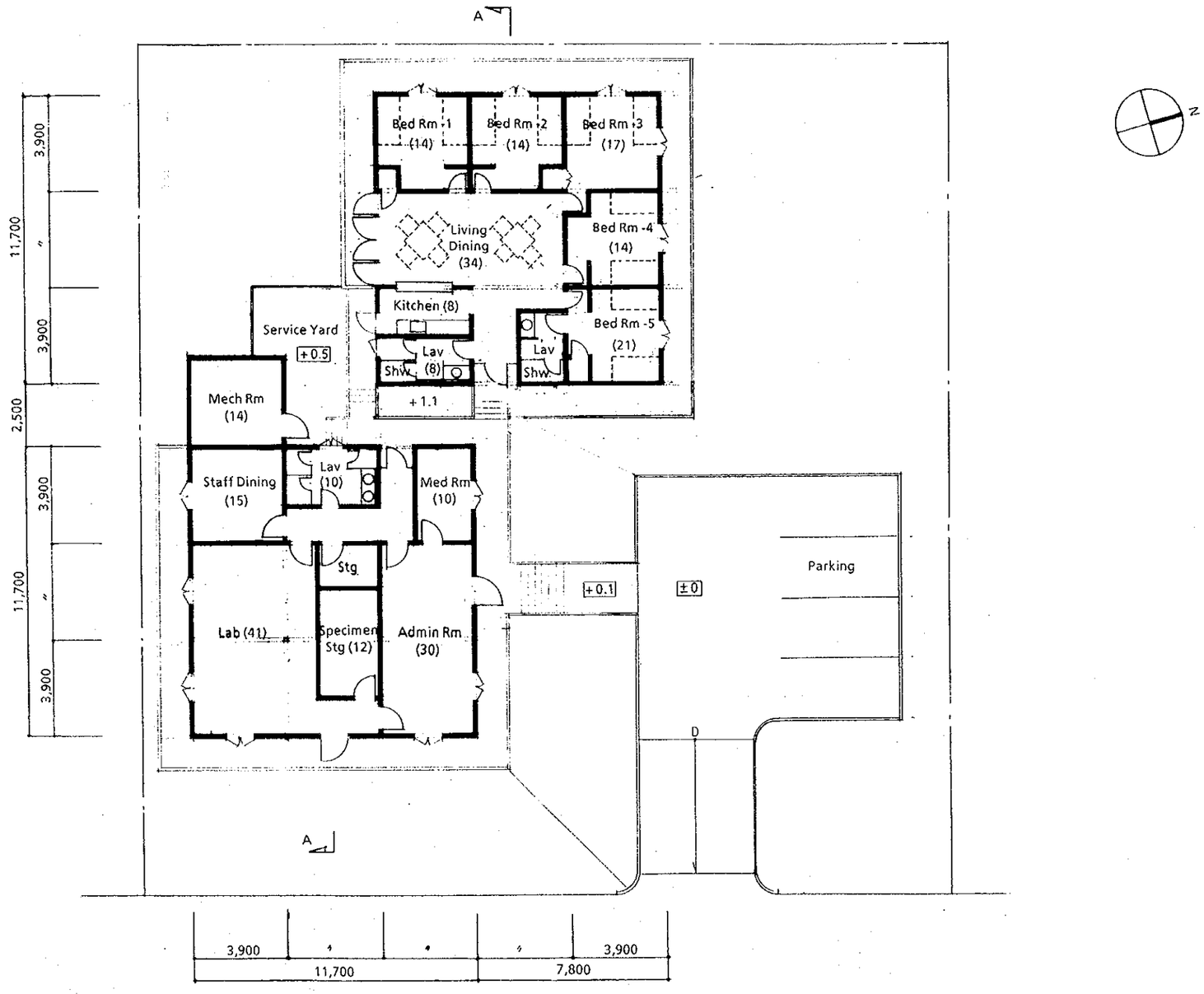
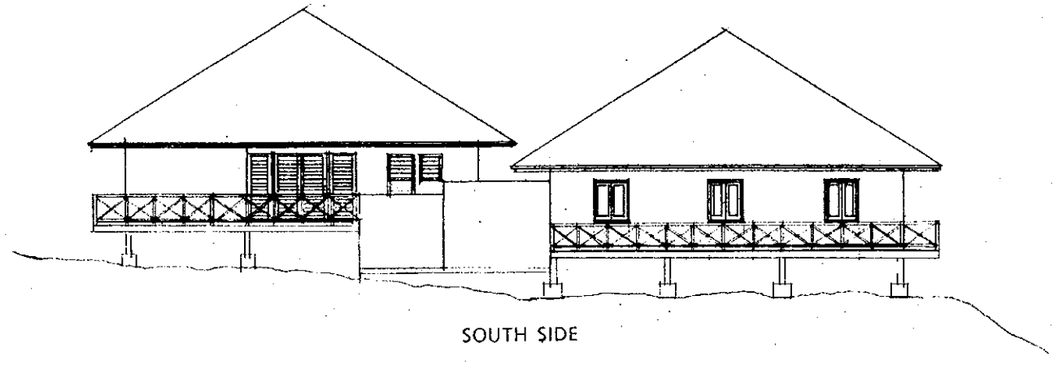
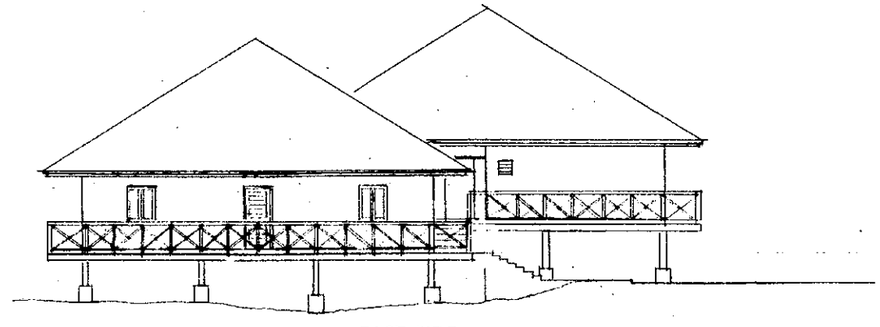
指定	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA HEADQUARTER BLDG	08
			指導	ELEVATION & SECTION 1 : 200	



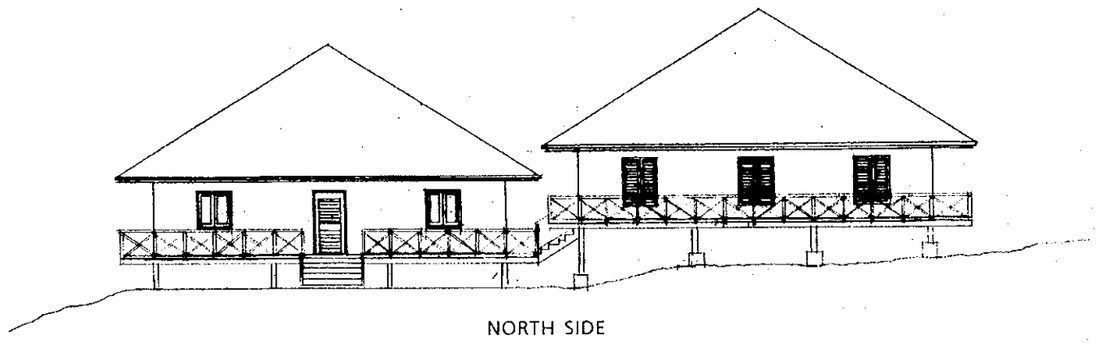
特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA RESEARCH STATION BLDG	図面番号 09
				SITE PLAN & PLAN 1 : 200	設計番号



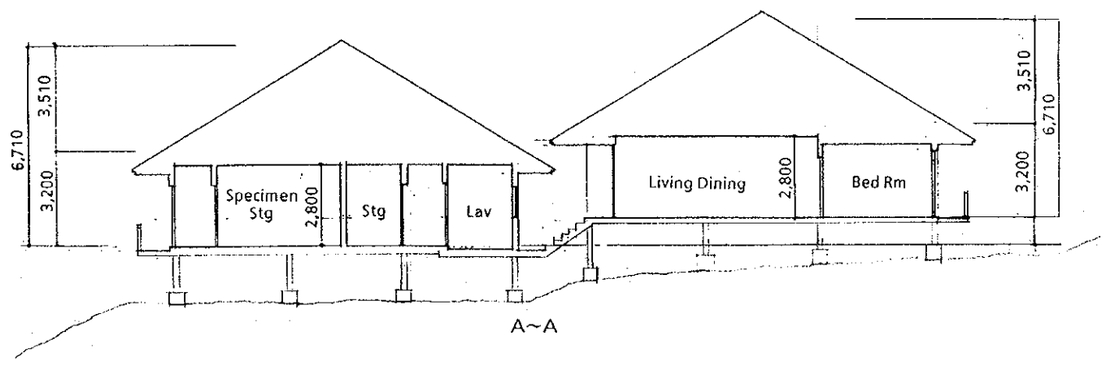
SOUTH SIDE



EAST SIDE

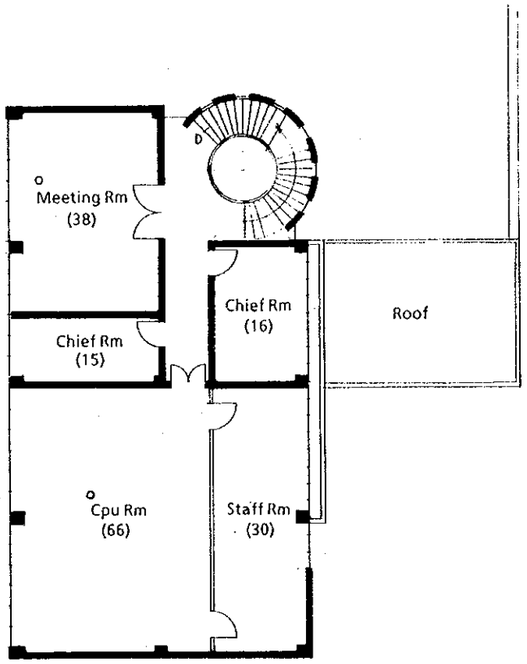


NORTH SIDE

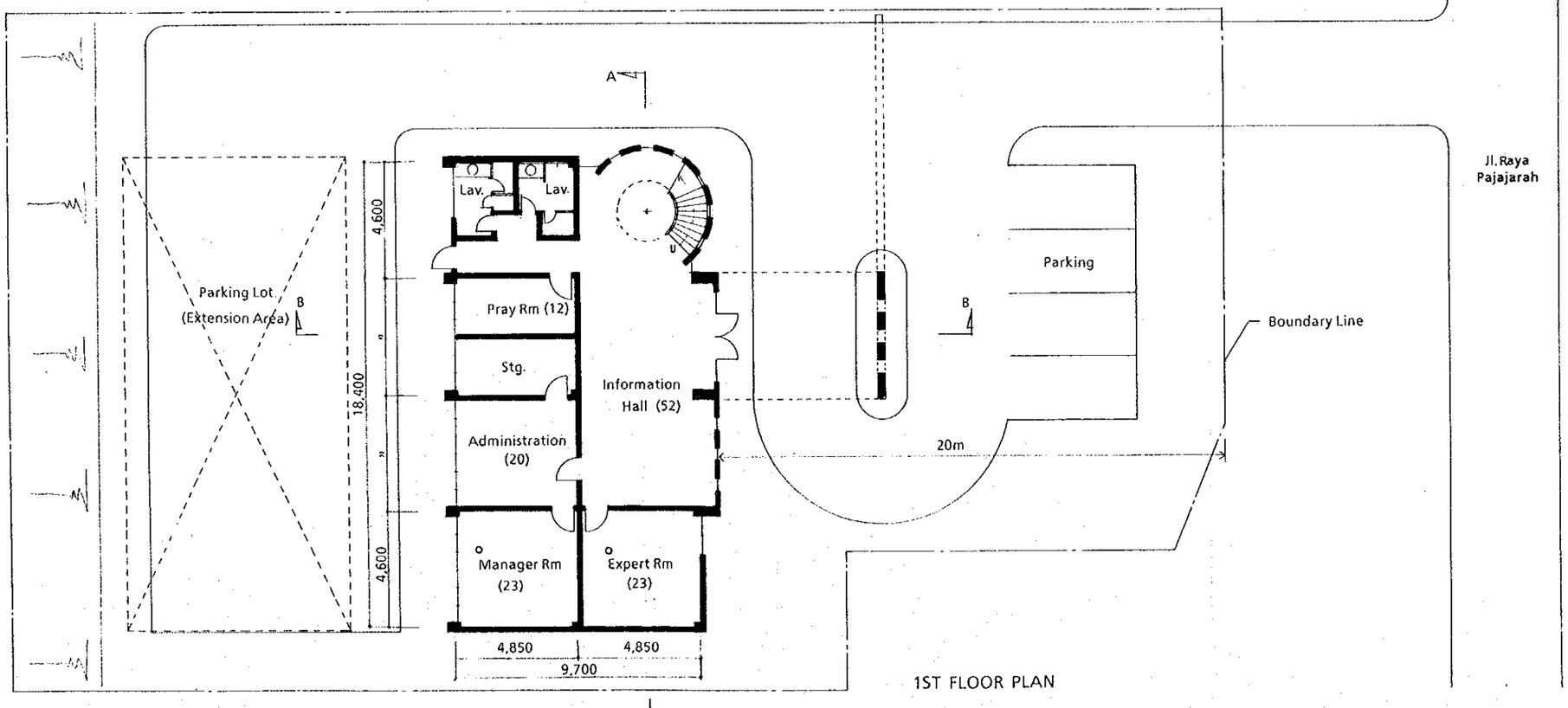


A~A

特記	打変	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA RESEARCH STATION BLDG	図面番号 10
				ELEVATION & SECTION 1 : 200	原作番号

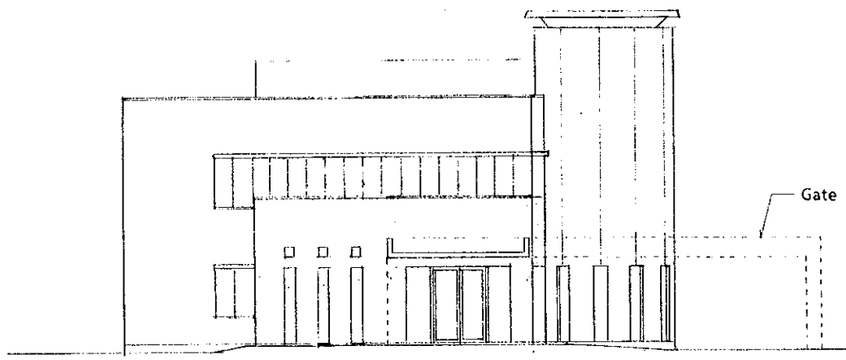


2ND FLOOR PLAN

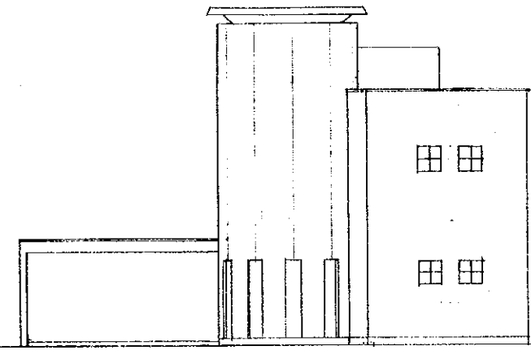


1ST FLOOR PLAN

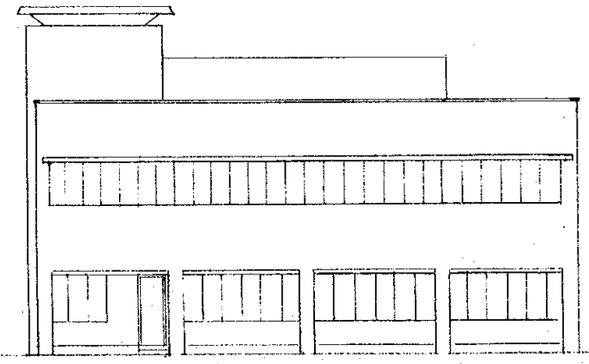
特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA NCIC BLDG	図面番号 11
			担当	SITE PLAN & PLAN 1 : 200	設計番号



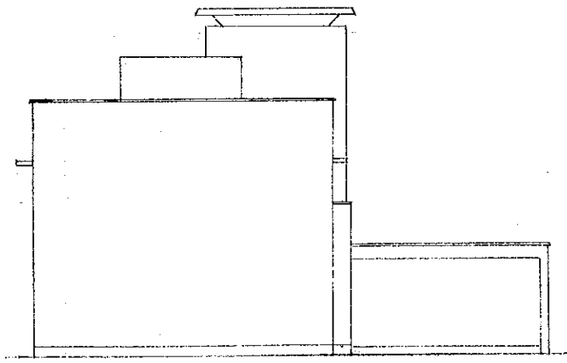
EAST SIDE



NORTH SIDE

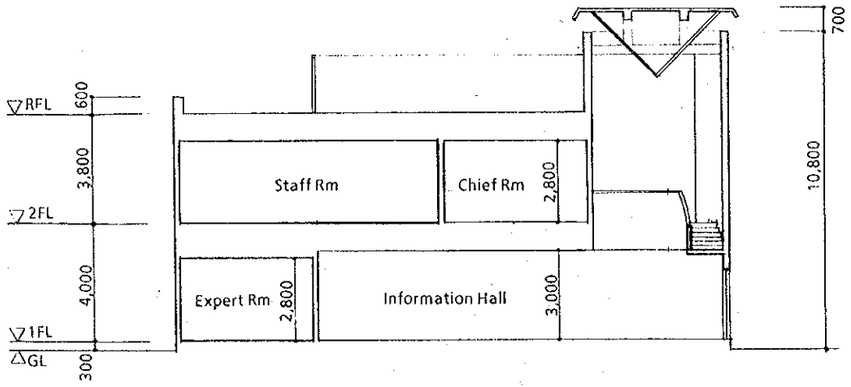


WEST SIDE

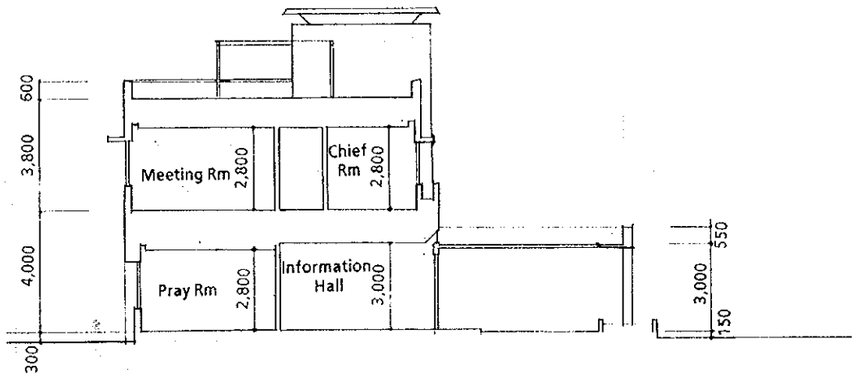


SOUTH SIDE

特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA NCIC BLDG	図面番号 12
			担当	ELEVATION 1 : 200	設計番号

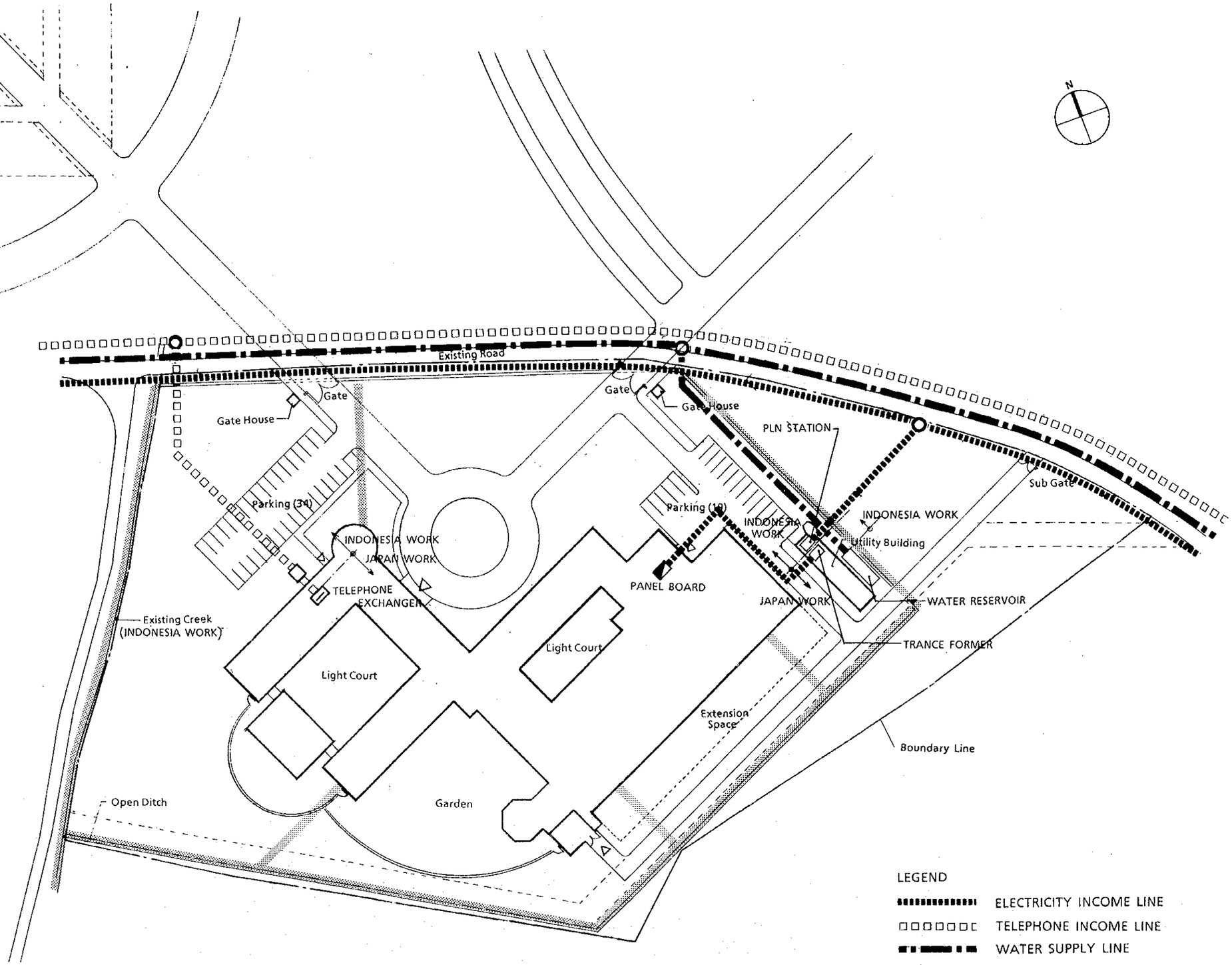


A~A

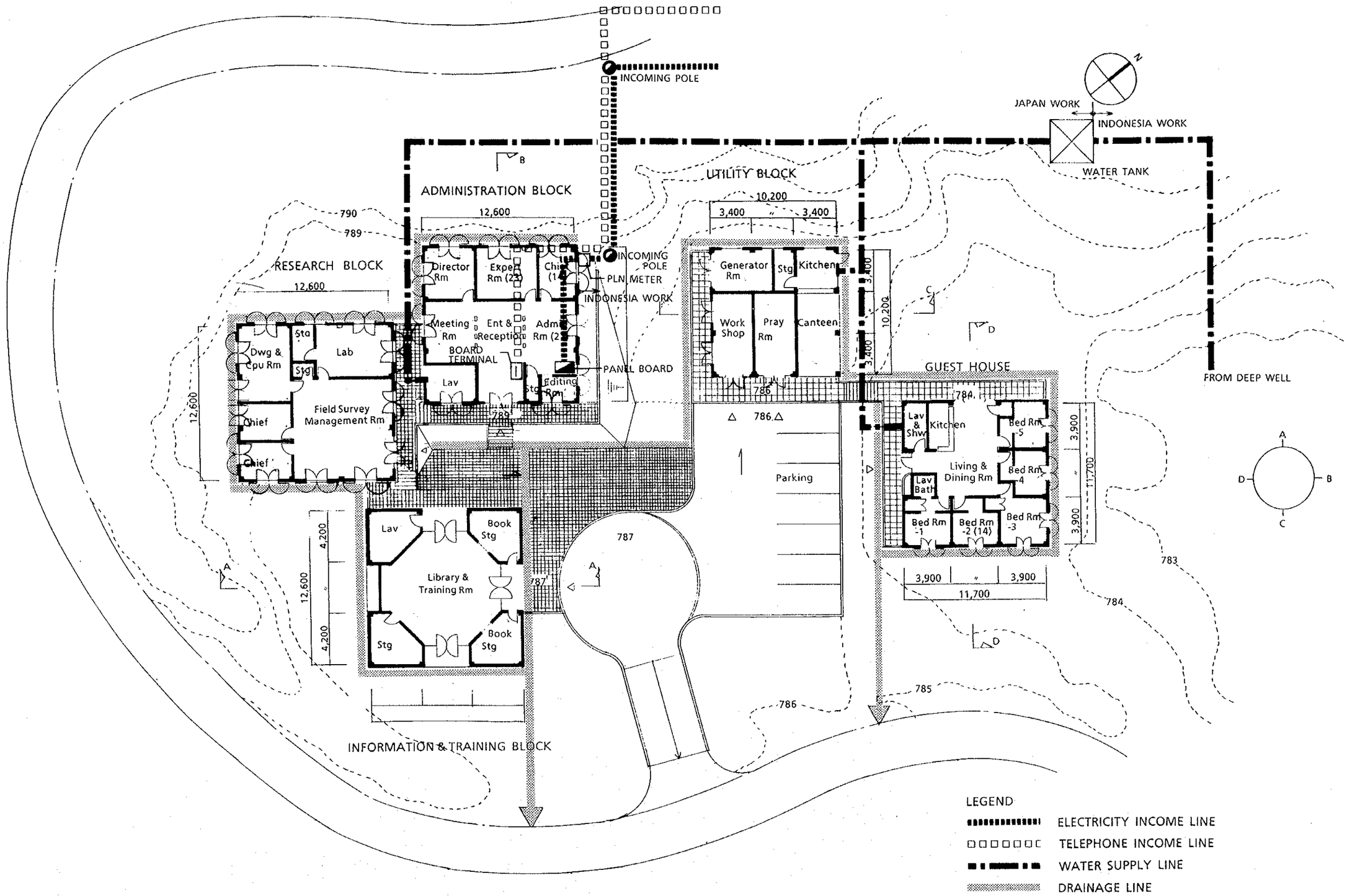


B~B

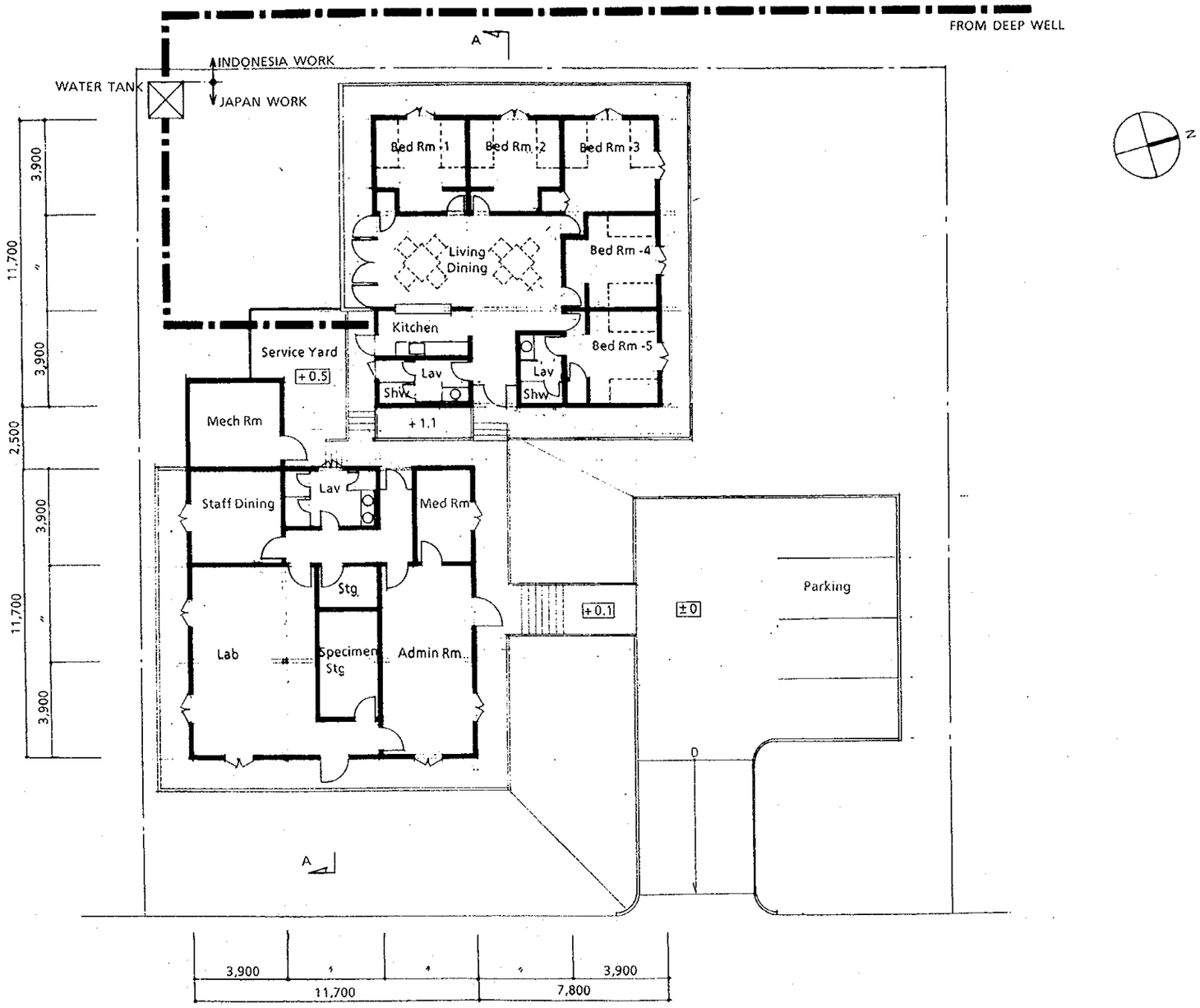
特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA NCIC BLDG	図面番号 13
			担当	SECTION 1 : 200	設計番号



特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BUILDING	図面番号 14
			担当	INFRASTRUCTURE LINE	設計番号



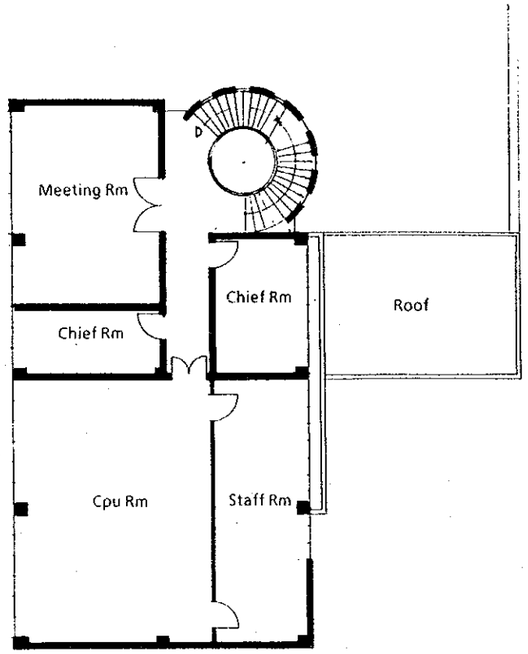
株式会社 久米設計 KUME SEKKEI	PHPA HEADQUARTER BLDG	図面番号 15
	INFRASTRUCTURE LINE	設計番号



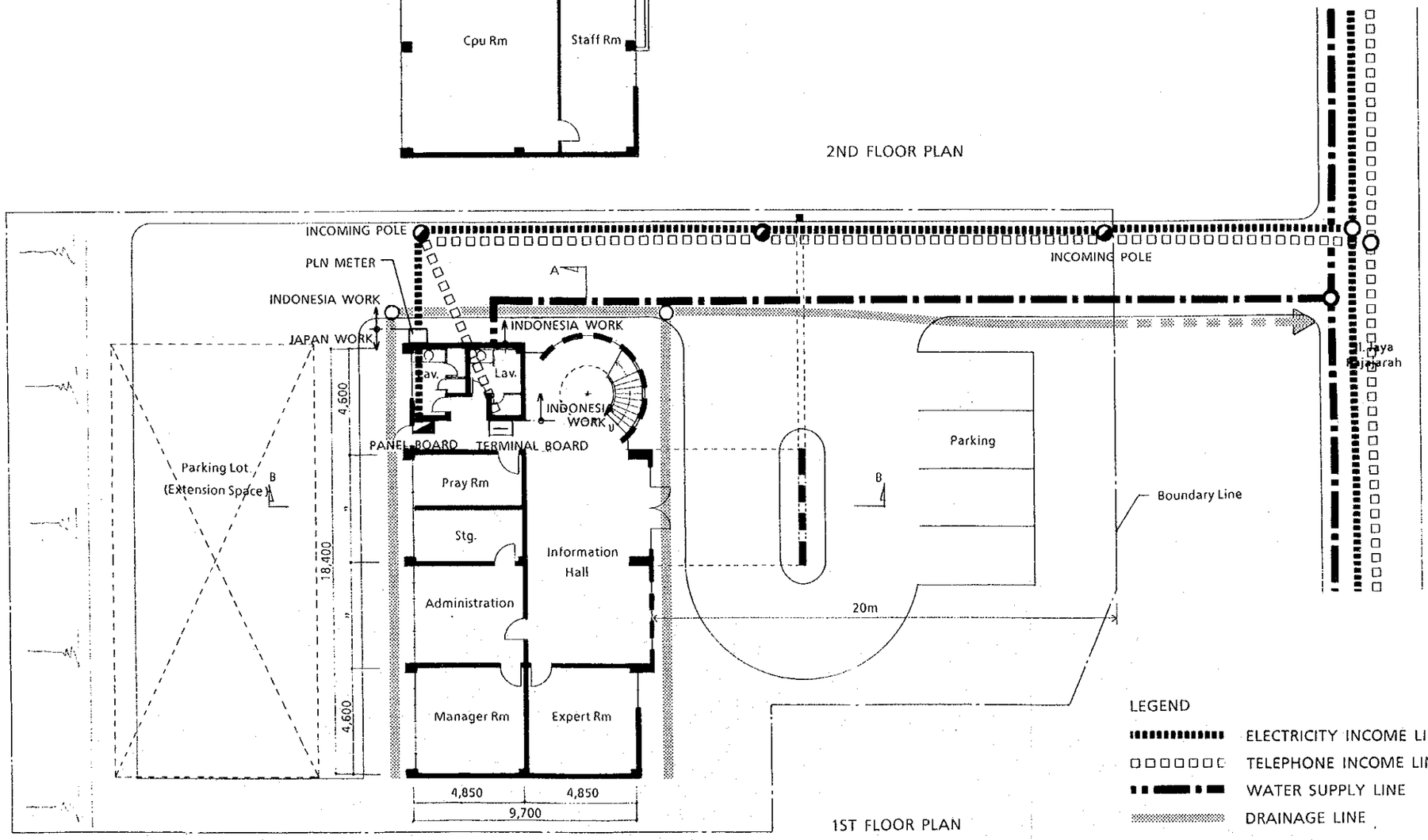
LEGEND

WATER SUPPLY LINE

特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA RESEARCH STATION BLDG INFRASTRUCTURE LINE	図面番号 16

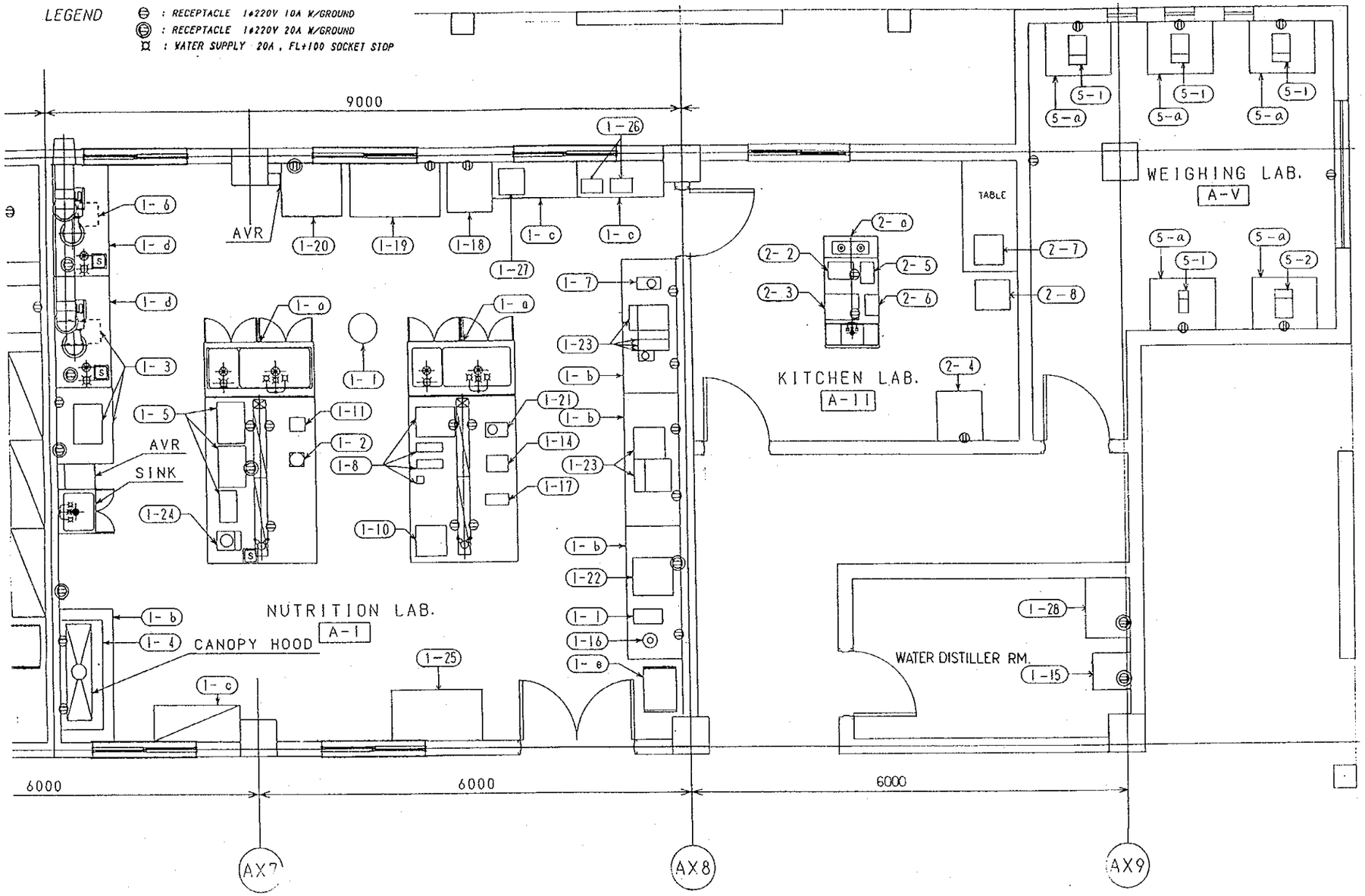


2ND FLOOR PLAN



1ST FLOOR PLAN

特記	訂正	株式会社 久米設計 KUME SEKKEI	PHPA NCIC BLDG	図面番号 17
		日付 PA	INFRASTRUCTURE LINE	設計番号



Equipment list

Nutrition Laboratory

1-1 : Sample mill1
1-2 : Blender
1-3 : Kjeltec
1-4 : Hydrolizing unit and Soxtec system HT6
1-6 : Digestion system (*)
1-7 : Moisture analyzer
1-8 : Automatic titrator
1-10 : Shaker
1-11 : Magnetic stirrer
1-13 : Birds/mammals Calorimetry
1-14 : Didital pH meter
1-16 : Eye wash post
1-17 : Spectrophotometer
1-18 : Refrigerator
1-19 : Deep freezer
1-20 : Dry freezer
1-21 : Electronic balance
1-22 : Auto Muffle furnace
1-23 : Body comp. analyzer
1-24 : Homogenizer
1-25 : Liquid chromatography
1-26 : Atomic absorption photometer
1-27 : Ultrasonic cleaner

Weighing Laboratory

5-1 : Analytical balance
5-2 : Microanalytical balance

Water distiller room

1-15 : Water distilling apparatus
1-28 : Two stage water distilling apparatus

Kitchen Laboratory

2-2 : Food processor
2-3 : Microwave
2-4 : Refrigerator
2-5 : Electronic balance
2-6 : Electronic balance
2-7 : Ultrasonic cleaner
2-8 : Dry box

特記 : (*) supplied in the laboratory, but, usually kept in the storage room or cabinet.

訂正

株式会社 久米設計 KUME SEKKEI

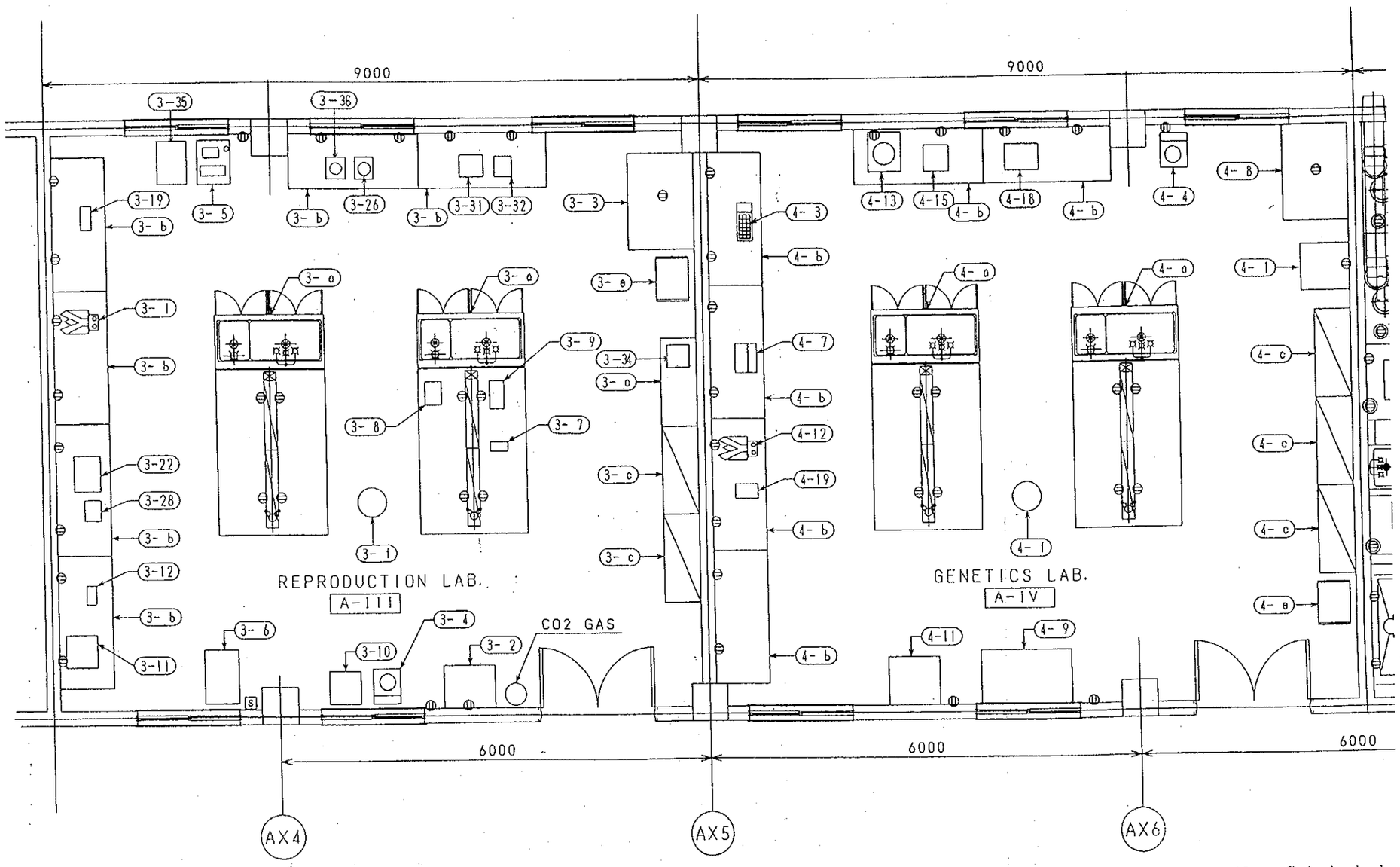
日付 PA

LIPI-RDCB ZOOLOGICAL BLDG

EQUIPMENT LAYOUT - 1

図面番号 18

設計番号



Equipment list

Reproduction Laboratory

3-1 : Microscopes (with camera lucida)
3-2 : Incubator CO2
3-3 : Laminar airflow
3-4 : Autoclave
3-5 : Pregnancy ultrasound scanner
3-6 : Centrifuge 20,000rpm
3-7 : Laparascopy
3-9 : Artificial insemination
3-10 : LNG Rapid semenfreezer
3-11 : Preservative freezer
3-12 : Slide warmer
3-13 : Sperm examination plate (*)
3-14 : Sperm counter (*)
3-15 : Artificial vagina (*)
3-16 : Dissecting instruments (*)
3-17 : Temperature and humidity meter (*)
3-19 : Hygrometer
3-20 : Radiation thermometer (*)
3-21 : Surface thermometer (*)
3-22 : Electrocardiogram
3-26 : Hematocrit centrifuge
3-28 : Blood calorimeter
3-29 : Haugh meter (*)
3-30 : Egg shell meter (*)
3-31 : Egg meter
3-32 : Egg shape factor meter
3-34 : Ultrasonic cleaner
3-35 : Dry box
3-36 : Refrigerated compact centrifuge

Genetics Laboratory

4-1 : Refrigerator
4-3 : Dry bath
4-4 : Autoclave
4-5 : DNA Thermal cycler
4-6 : Agarose submarine gel apparatus (*)
4-7 : Electrophoresis power supply
4-8 : Laminar flow hood with UV option (*)
4-9 : Freezer
4-11 : Incubator 37°C
4-12 : Microscope + photogrametry
4-13 : Swinging back centrifuge
4-14 : Water bath
4-15 : Orbital shaker
4-16 : Phast system (*)
4-18 : Microwave
4-19 : Balance
4-20 : Slab gel electric apparatus (*)
4-21 : Tall mighty small vertical slab unit (*)

備考 (*) supplied in the laboratory, but, usually kept in the storage room or cabinet.

訂正

株式会社 久米設計 KUME SEKKEI

日付 PA

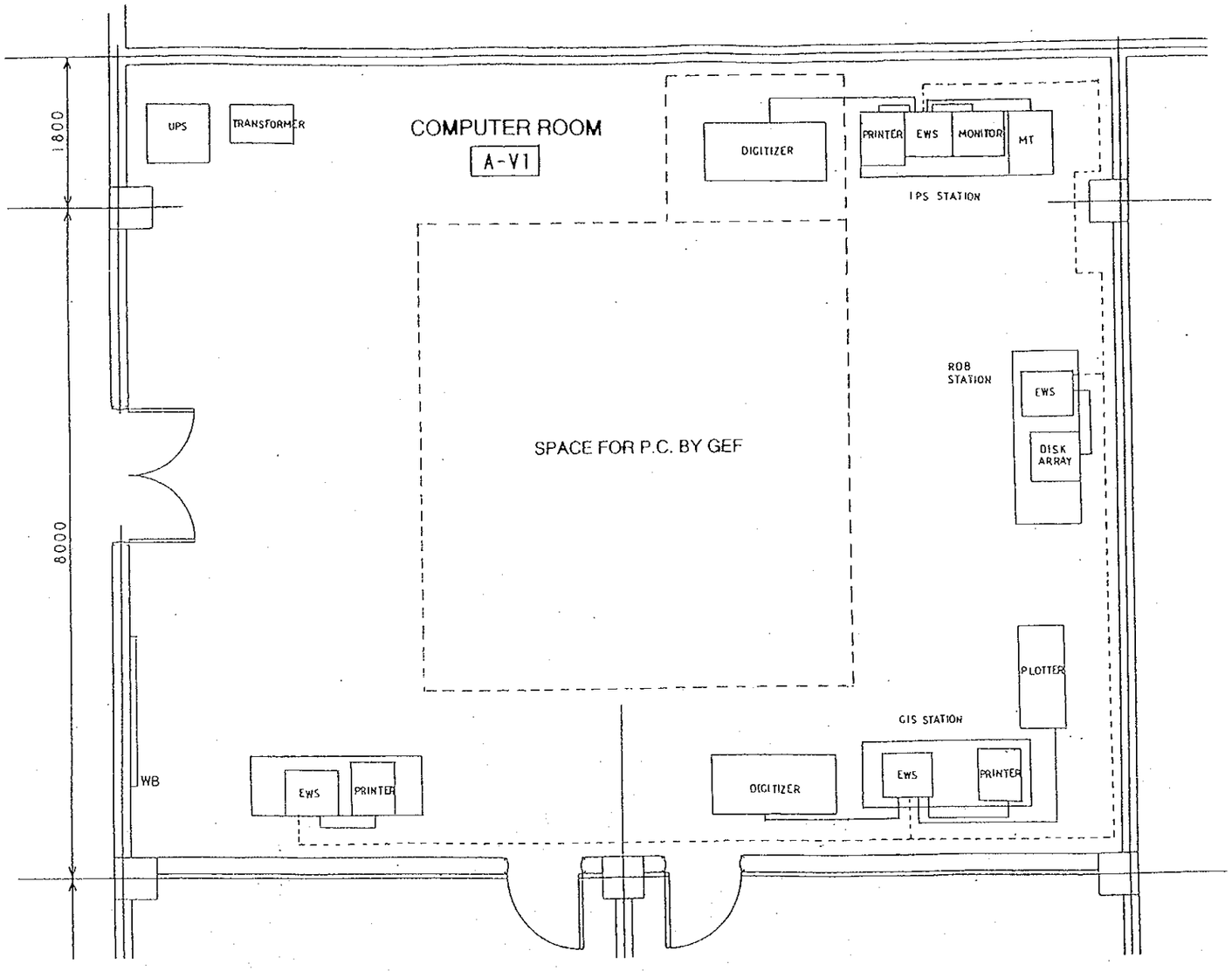
担当

LIPI-RDCB ZOOLOGICAL BLDG

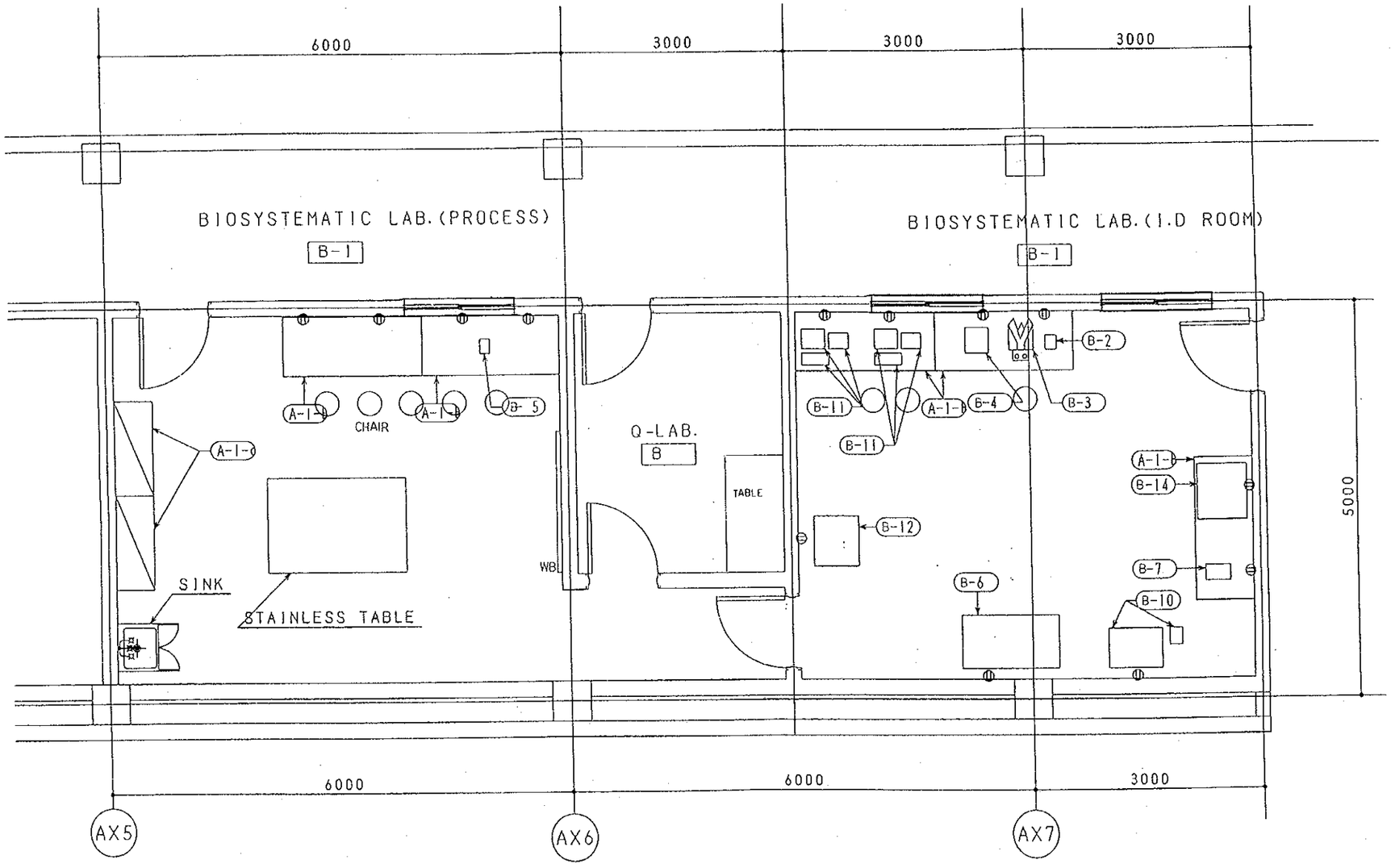
EQUIPMENT LAYOUT - 2

図面番号 19

設計番号



特記	訂正		株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BLDG	図面番号 20
				担当	EQUIPMENT LAYOUT - 3	設計番号



Equipment list

Biosystematic Laboratory

B-2 : Stereo binocular microscope + camera lucida
B-3 : Compound binocular microscope + camera lucida
B-4 : Zoom stereo microscope
B-5 : Dissecting microscope
B-6 : Deep freezer
B-8 : Spring balance (*)
B-9 : Dissecting kit (*)
B-10 : X-ray
B-12 : Photocopy machine
B-14 : Oven
B-15 : Dry box

特記 : (*) supplied in the laboratory, but, usually kept in the storage room or cabinet.

訂正

株式会社 久米設計 KUME SEKKEI

日付 PA

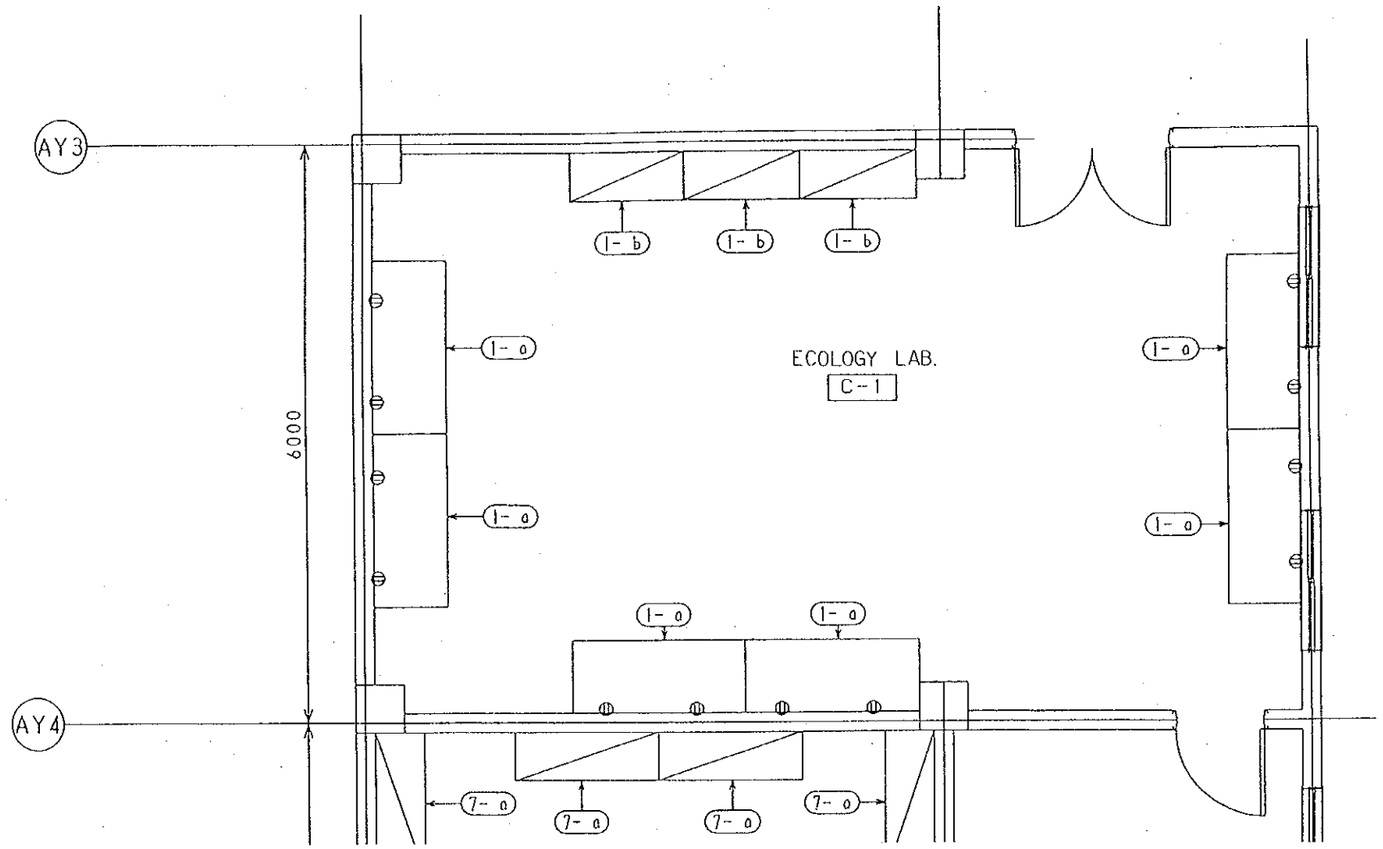
担当

LIPI-RDCB ZOOLOGICAL BLDG

EQUIPMENT LAYOUT - 4

図面番号 21

設計番号

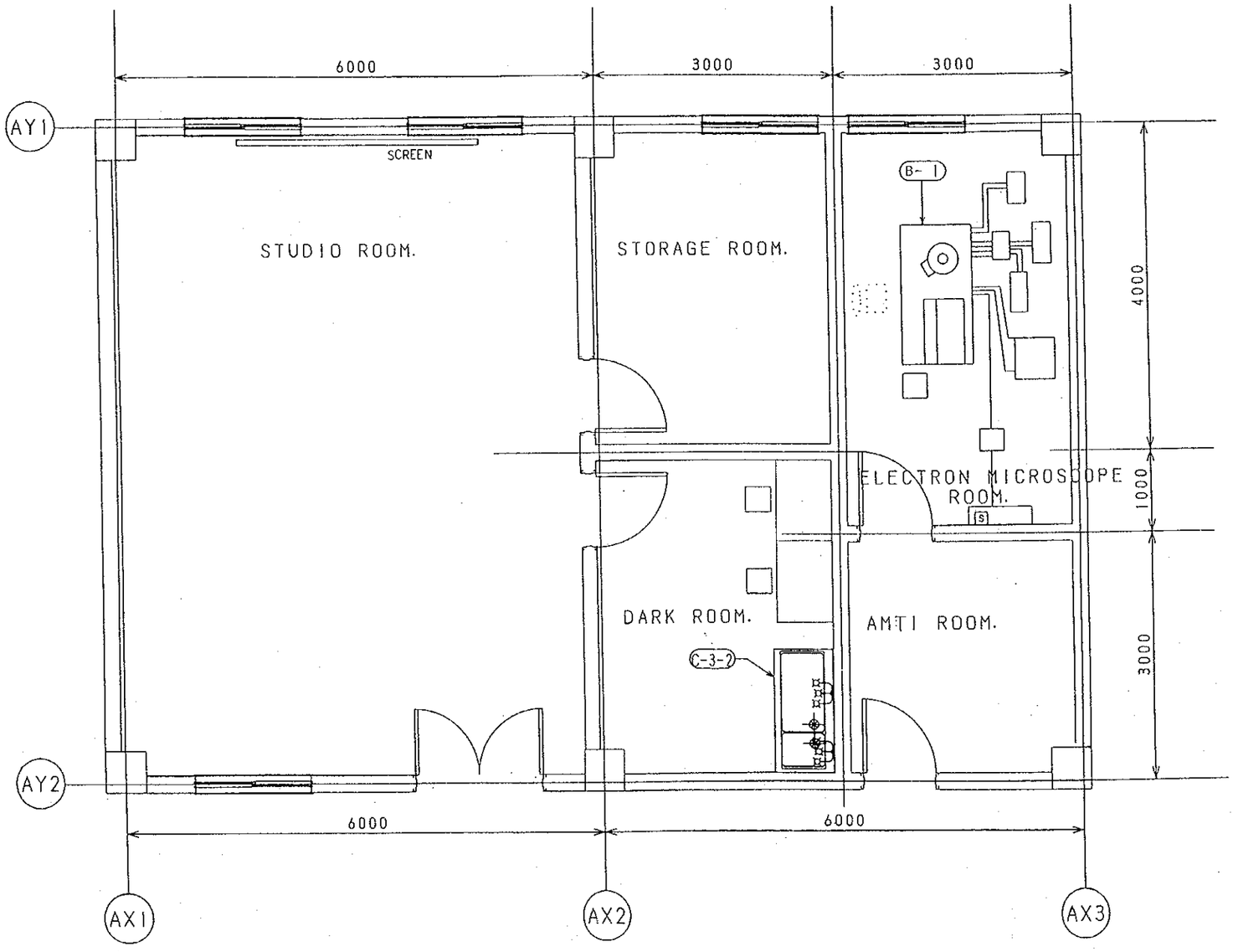


Equipment list

Ecology Laboratory

- Cassette recorder
- Sonograph (with printer)
- Video player
- Radio telemetry
- Ultrasound
- GPS (with battery + charger)
- Portable water quality meter

特記	訂正	株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BLDG	図面番号	22
			担当	EQUIPMENT LAYOUT - 5	設計番号	



Equipment list

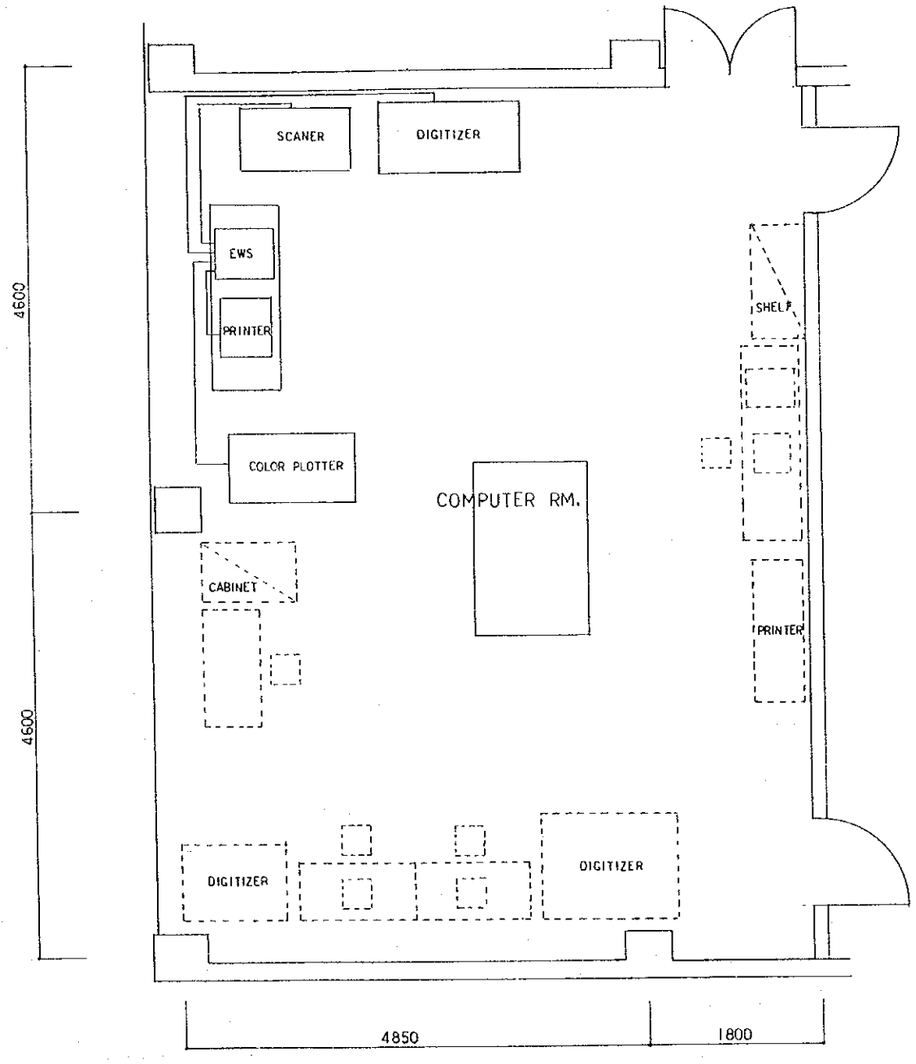
Electron microscope room

B-1 : Scanning electron microscope

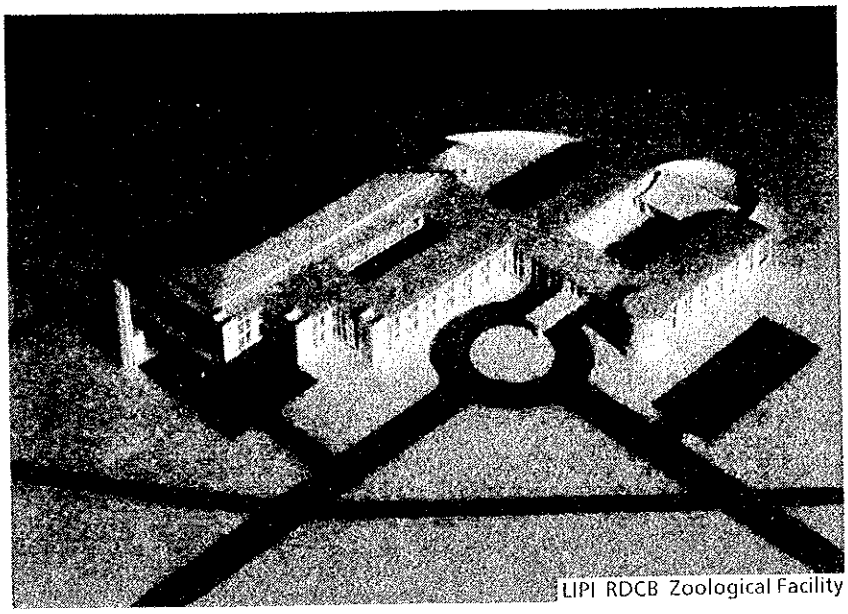
Dark room

C-3-1 : Dark room equipment
C-3-2 : Sink and drainboard

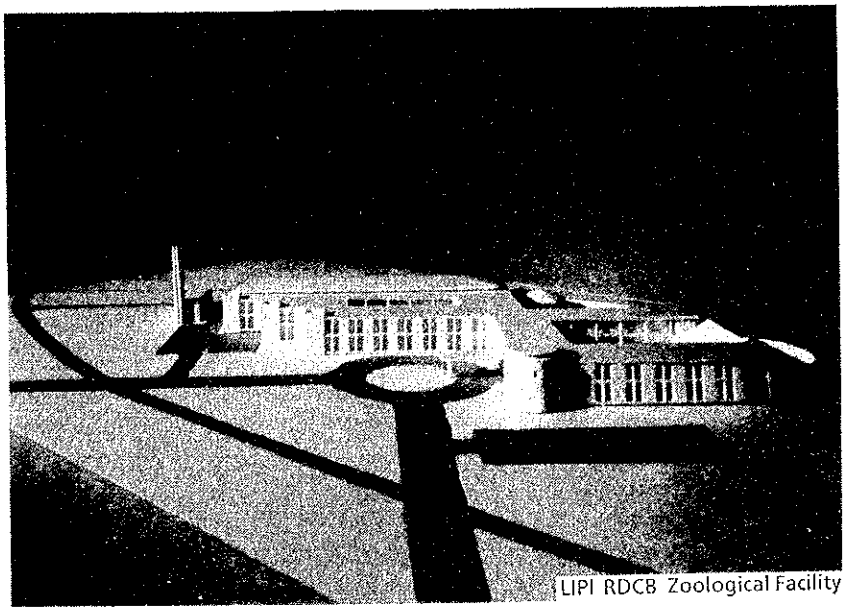
特記		株式会社 久米設計 KUME SEKKEI	日付 PA	LIPI-RDCB ZOOLOGICAL BLDG	図面番号 23
			担当	EQUIPMENT LAYOUT - 6	設計番号



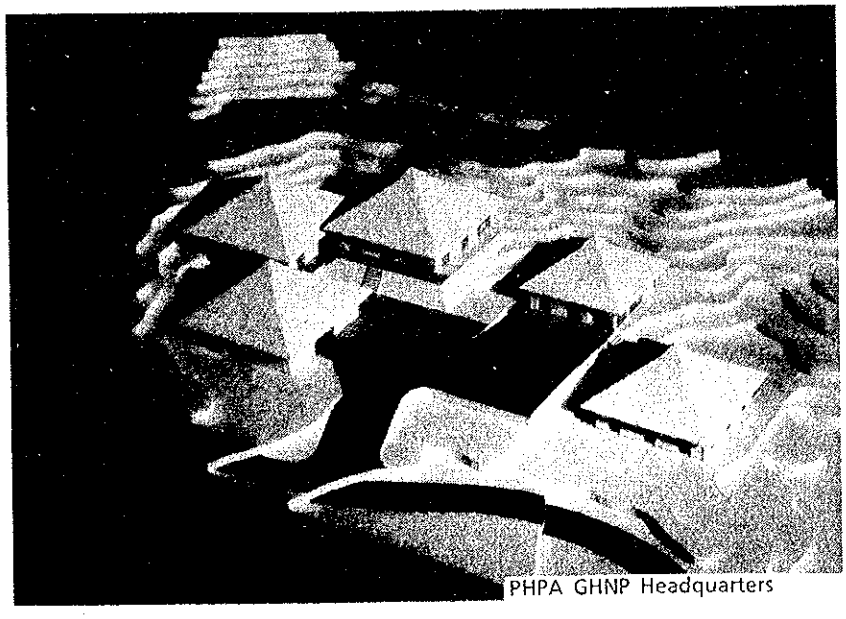
株式会社 久米設計 KUME SEKKEI	日付 PA	PHPA NCIC BLDG	図面番号 24
	担当	EQUIPMENT LAYOUT	設計番号



LIPI RDCB Zoological Facility



LIPI RDCB Zoological Facility



PHPA GHNP Headquarters