CHAPTER 4 BASIC PLANNING

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4-1 Basic Principles

PETROLAB will be composed of the main laboratory building and the sample preparation building, with a total staff of 76. The basic policies in designing the project are:

(1) to respect the desire of the Philippines in the selection of machinery and equipment to be provided and to consider the simplest system for their easy operation and maintenance;

(2) to keep the construction cost low and to attain the maximum floor area within the budget;

(3) to design the laboratory to be able to minimize the maintenance cost after completion;

(4) to utilize domestic Philippine products and materials and to respect local construction methods, and

(5) to harmonize the environment of surrounding area.

4-2 Arrangement of Buildings

4-2-1 Building Characteristics

The PETROLAB building plan proposed by BMG in January 1981 was to construct a 4-storey building with a building area of 600 square meters on a site area of about 1,200 square meters.

The outstanding feature of PETROLAB is the large amount of laboratory equipment for precision analysis which extremely requires a minimum of vibration, noise and dust to be installed and operated in the laboratory. Especially geochronological equipment which will analyze very small quantities is so sensitive that any vibration may cause analysis errors. Therefore it is prudent to construct the sample preparation unit where laboratory equipment that generates vibration, noise and dust, such as jaw crushers and roll crushers for the coarse crushing, a shaking screen or mixer, in a separate building from the research and analysis division, and the administration and service division, which will be in the main building. As for this main building, it is more effective to lower the proposed 4-storey construction to 2-storeys so as not to expand the interior fine vibration and

vibration through the building. In addition, the most vibration-sensitive laboratory equipment shall be installed on the first floor and the foundation shall be separated from the building in order not to transfer vibration.

Elevators will be necessary for the 4-story building, which will increase the contruction cost and maintenance cost as well as cause inconvenience in the building use in case of a breakdown. A 4-story building may require a longer construction period than 2-story one. Based on the above conditions, the main building of PETROLAB is designed as a 2-story building.

The 2-storey building needs about twice as big a building lot as a 4-storey buildings, when it must keep the same floor space. Therefore, the building area has been changed from northern part of the BMG's Quezon site to southern part because of the shortage of the space.

4-2-2 Arrangement of Buildings

The existing metallurgical laboratory, north of PETROLAB, serves in selecting minerals where the laboratory equipment generating vibrations is running. The adjacent geological and assay laboratory which is under construction at present also may create vibrations in the future. A shock absorbing zone at least 10 m wide will be provided between these laboratories and PETROLAB. Considering the future BMG administration bldg. plan, the main laboratory building will be designed as a 2-storey corridor type with 5 m x 13 spans = 65 m long on an east-west axis, 9 m x 2 spans =18 m wide from north to south. A shock absorbing zone 10 m wide is to be provided on the south side of PETROLAB between it and the future administration building.

The fact that the south side of the site faces the east-west road let the main axis of the building be designed east to west, resulting in a comfortable building environment in terms of lighting and ventilation and will enable the heat load of the air conditioning to be lessened.

4-2-3 Traffic Circulation

The main access will be arranged on the east side, the same as at present, and run straight to the mining equipment storage area, the very back of the grounds. The main laboratory will border the access

road on the east end and have the main entrance there. The staff parking area will be arranged along this access road beyond the main entrance of the main laboratory building. The main parking area is to be located in front of the planning administration building. Parking accommodations will be for 70 to 80 cars including the staff parking area. The administration building plan may be amended in the final arrangement plan.

4-3 Architectural Planning

4-3-1 Functional Components of PETROLAB

PETROLAB is composed of the following functional components which specified in the basic drawings in the following chapter (numbers are matched with the room numbers shown in the drawings):

(1) Administration and Service Division

This division consists of the administrative, mutual training and building service rooms.

114 Entrance Hall, 120 Machine and E ectricity Room, 115·208 Lavatories (M), 116·209 Lavatories (W), 201 Lecture Hall, 211 Cafeteria, 212 Kitchen, 213 Conference Room, 214 Copy Room, 215 Office, 216 Manager Room

(2) Research and Analysis Division

1. Sample Preparation Service Unit

This unit consists of a rough, moderate and fine crushing section and a grinding section, which process test samples from acquired samples to be ready for testing by analyzers in each unit. Both of these sections create vibration, noise and dust. This unit is to seperate from the main laboratory building, and arranged in the annex building.

301 Dry Sample Preparation Room, 304 Wet Sample Preparation Room

2. Megascopic and Microchemical Service Unit

This unit serves simple and rapid analysis for outside clients.

102 Megascopic and Microchemical Room

3. Petrography-Mineragraphy Service Unit

This unit is to study and analyze rocks and minerals.

204 Petrography and Mineragraphy Laboratory

4. Mineral Analysis Service Unit

This unit is complised of a wet and dry chemical laboratories.

207 Wet Chemical Analysis Laboratory, 206 Dry Chemical Analysis Laboratory, 205 Balance Room

5. X-ray Spectrometry and Diffractometry Service Unit

112 X-ray Spectrometry and Diffractometry Laboratory,

110 Research Room, 113 X-ray Microanalyzer Room, 111 Dark Room

6. Geommological Service Unit

This unit is to study gemms.

103 Gemmology Laboratory.

7. Isotope Geochemistry and Geochronology Service Unit

This unit will carry out geochronological measurements of rocks and minerals.

108 Mass Spectrometry Laboratory, 105 C14 Analyzer Laboratory

109.104 Sample Preparation Room

8. Paleontological Geochronology Service Unit

This unit is to judge geochronological age from paleontological analysis.

203 Paleontology Laboratory

9. Paleomagnetic Geochronology Service Unit

This unit is to determine geological structure measuring the residual magnetism of rocks.

107 Paleomagnetic Laboratory, 106 Research Room

10. Rock and Mineral Standards Library

A library to collect rock and mineral standards.

118 Rock and Mineral Standards Library, 119 Fossil Standards Library

11. Book Reference Library

202 Library

12. Spare Room

101 Spare Room

4-3-2 Main Laboratory Building

(A) Zoning

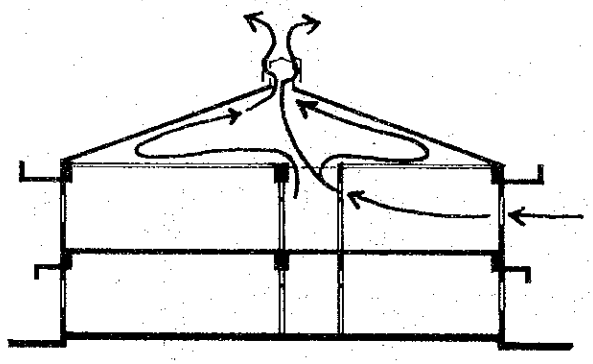
The building will be 2-storey, 65 m wide east-west and 18 m in depth north to south. A corridor will run east-west along the axis

of the building in the center; research and analyzing rooms which accommodates the laboratory equipment requiring minimal vibrations will be on the south side, and administrative, conference, electric or machine room and a cafeteria on the north side. The north side rooms are to protect the research and analyzing rooms from the vibraions created in the north metallurgical laboratory which deals with selection of minerals.

(B) Adaptation to Climate

The main problem of designing the laboratory in terms of weather is how to design the building to withstand the strong sun of the dry season and high temperatures and humidity and showers in the rainy season. Manila is located at 14°37' N latitude with a southing solar height of 52° S at the winter solstice and northing solar height of 81° N at the summer solstice. Therefore windows will not be placed on the east and west sides, to receive minimum solar heat, but placed on the north and south sides with wide canopies to eliminate the sun's rays and leaking in heavy rains. The roof is to be tiled and of a steep pitch in order to prevent water leak in case of rain showers as well as to utilize the spacious attic as a heat insulating zone. The hot air absorbed through the roof will be ventilated by a natural ventilation which is to be designed on the ridge.

As for rooms on the second floor with no air conditioning, fresh air will be taken through the exterior windows, flow to the corridor



natural ventilation

by the transom windows above the room doors, to the attic through the opening on the corridor ceiling and serve as supply air for the air exhaust through the ventilator on the roof ridge. This air flow is shown in the preceding page.

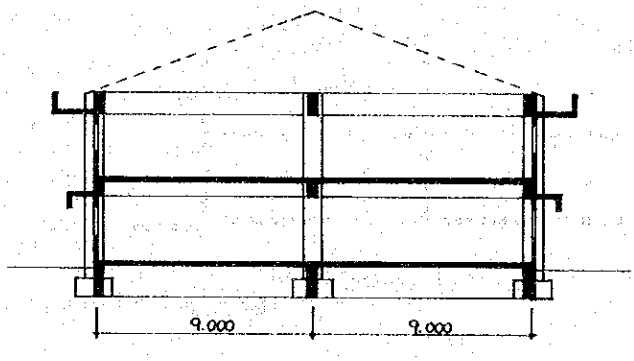
(C) Mateirals

Finishes will be applied such as Philippine roofing tiles over the wooden truss sub-roof for the roofs, synthetic adobe finish which is commonly used in the country for the exterior walls, mortar painted finish for the interior walls, plastic tiles for the floors, and direct exposure of the second floor slab soffit for the first floor ceiling. The second floor will have heat insulating ceiling boards. Partition walls will be block walls except the east and west end walls and the central earthquake resisting wall.

Materials used shall be so specified that Philippine domestic products will be applicable. However, products not produced in the Philippines or those made in the Philippines involve difficulties with quality, quantity and/or delivery schedules may revert to imports from Japan.

(D) Structure

The building will be a 2-storey reinforced concrete structure, with the foundations on the adobe deposit. The structure will be rigid frame with five (5) meter spans along the ridge direction and with symmetrical nine (9) meter spans. The canopies on the north and south sides will also be designed in symmetrical shape to acquire a uniformly distributed load for the structural simplicity and low cost in construction.



balanced frame

(E) Equipment

Air conditioning will be the central system and will be provided only to the rooms necessary for proper operation of machines. For some of the equipment which will require power supply even in time of power failure for their operation, such as mass spectrometer, C14 analyzer etc., a generator with sufficient capacity will be installed. A fire alarm system with the central control will also be installed.

Basically ducts and pipes will be arranged in exposure to insure accessibility for the discovery of damaged parts as well as for maintenance.

(F) Module

The basic module value of the laboratory plan is to be 750 mm. This dimension is the greatest common measure of those of the laboratory equipment, facilities and furniture as is shown in the following figure. Based on the dimension of 750 mm, a module table has been estimated as follows. Each room's dimensions will be based on this table.

Module Table

25	[5]	1	2	4	8	16	32	64
(75)	15	3	6	12	24	48	96	
	45	[9]	18	36	72			
		27	54					

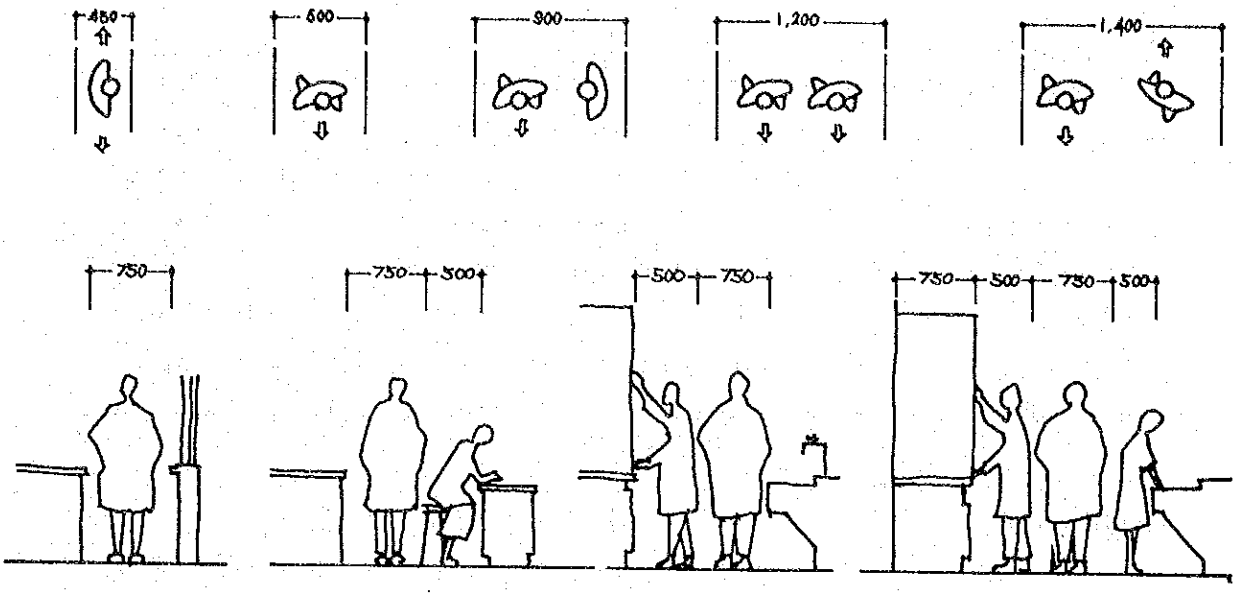
Note:

i) The above figures may be read with free units, for example, 75 may be read 7.5 mm, 7.5 cm or 7.5 m.

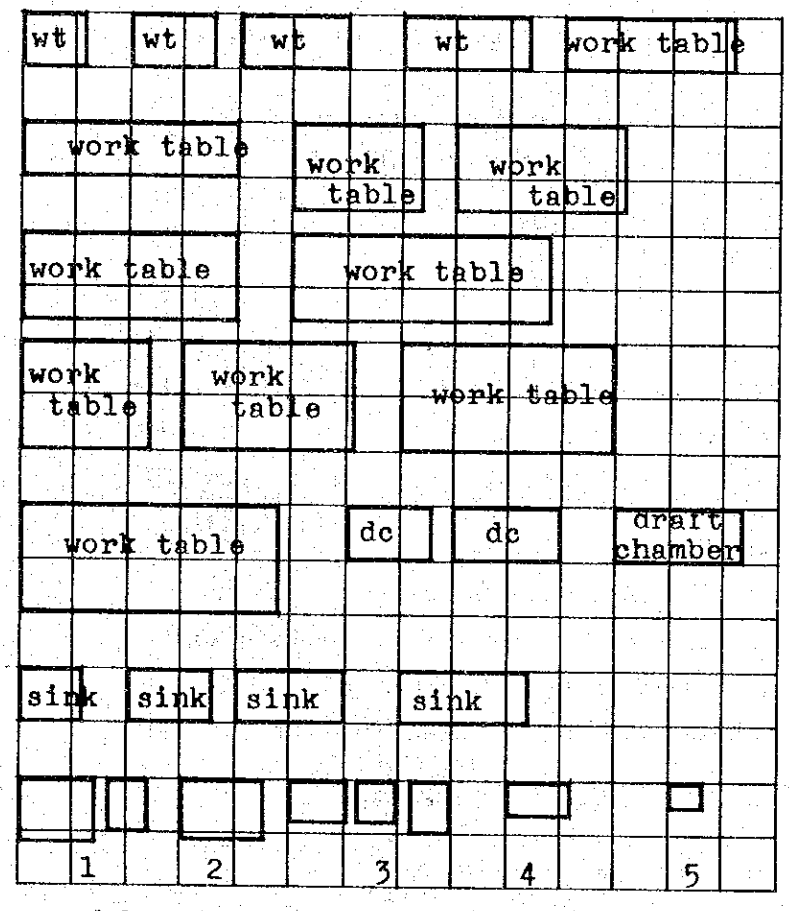
ii) From the basic module 75 double numbers are listed to the right, treble numbers downward and one third numbers upward.

iii) Numbers shall be limited within two (2) figures.

iv) (75) means the basic module, [5] and [9] mean the spans of the main laboratory building.



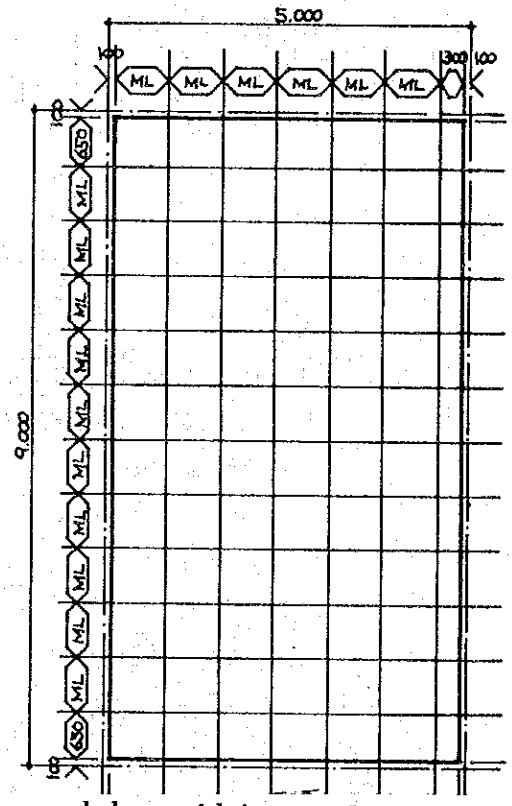
width of passage



laboratory equipment in modular grid

(750mm x 750mm)

1 x-ray diffractometer
2 x-ray fluoressence analyzer
3 bead sampler
4 atomic absorption
5 gas chromatograph



mondular grid in standard span

4-3-3 Sample Preparation Building

The sample preparation building will be a single-storey structural steel construction with corrugated asbestos-cement sheets on the roof and exterior wall and an abrasion resisting smoothed face concrete floor. A room ventilation system will be supplied.

4-3-4 List of Floor Area & Facilities

Abbreviation: F: Facilities
AC: Air Conditioning
MV: Mechanical Ventilation

a) Main Building

Room No.	Room Name	Floor Area
GROUND FLOOR		
101	SPARE ROOM F: MV	90 m^2
102	MEGASCOPIC & MICROCHEM. ROOM F: AC	45 m^2
103	GEMMOLOGY LAB. F: AC	45 m^2
104	SAMPLE PREPARATION ROOM F: AC & MV	45 m^2
105	C14 ANALYZER LAB. F: AC	45 m^2
106	RESEARCH ROOM F: AC	45 m^2
107	PALEOMAGNETIC LAB. F: AC	45 m^2
108	MASS SPECTROMETRY LAB. F: AC	45 m^2
109	SAMPLE PREPARATION ROOM F: AC & MV	45 m^2
110	RESEARCH ROOM F: AC	35 m^2
111	DARK ROOM F: AC & MV	10 m^2
112	X-RAY SPECTROMETRY & DIFFRACTOMETRY LAB. F: AC	67.5 m^2

113	X-RAY MICROANALYZER ROOM		22.5 m^2
	F: AC		
114	ENTRANCE HALL		45 m^2
115, 116 & 117	LAVATORY (M), (W), & SHOWER ROOM		32.5 m^2
	F: MV		
118	ROCK & MINERAL STANDARDS LIBRARY		139.75 m^2
	F: MV		
119	FOSSIL STANDARDS LIBRARY		32.5 m^2
	F: AC		
120	MACHINE & ELECTRICITY ROOM		107.25 m^2
-	CORRIDOR & STAIRCASE		183 m^2
-	PIROTIS		45 m^2
		TOTAL	1,170 m^2

SECOND FLOOR

201	LECTURE HALL	180 m^2
	F: MV	
202	LIBRARY	90 m^2
	F: AC	
203	PALEONTOLOGY LAB.	90 m^2
	F: AC	
204	PETROGRAPHY LAB.	90 m^2
	F: AC	
205	BALANCE ROOM	45 m^2
	F: AC	
206	DRY CHEMICAL LAB.	67.5 m^2
	F: MV	
207	WET CHEMICAL LAB.	112.5 m^2
	F: MV	
208, 209 & 210	LAVATORY (M), (W), & SHOWER ROOM	32.5 m^2
	F: MV	
211 & 212	CAFETERIA & KITCHEN	107.25 m^2
	F: MV	
213	CONFERENCE ROOM	65 m^2
	F: AC & MV	
214	COPY ROOM	32.5 m^2
	F: MV	
215	OFFICE	48.75 m^2
	F: AC	

216	MANAGER ROOM		26 m^2
	F: AC		
-	CORRIDOR AND STAIRCASE		183 m^2
		TOTAL	1,170 m^2
		GRAND TOTAL	2,340 m^2

b) Sample Preparation Building

Room No.	Room Name		Floor Area
301, 302 & 303	SAMPLE PREPARATION ROOM (DRY)		80 m^2
	F: MV		
304	SAMPLE PREPARATION ROOM (WET)		80 m^2
	F: MV		
		TOTAL	160 m^2

4-4 Structural Planning

Earthquake force and wind force must be taken into consideration because the Philippines are a part of the Pacific Ocean seismic zone and is a breeding ground for the typhoons which strike Japan. However, Quezon City (Metropolitan Manila) where the site of the PETROLAB construction project is located, is in a category where earthquake force is high moderate and wind force is moderate. Their horizontal force is smaller than that in Japan.

4-4-1 Structural Frame Planning

The structure of PETROLAB building is to be a reinforced concrete construction, 2-storey structure, whose roof is to be designed with wooden structure. As PETROLAB is to be a 2-storey building, earthquake resisting walls will be arranged in some places as a horizontal force resisting element in order to minimize the construction cost. Other walls will be concrete block walls so that they can be removed with a partition design change on account of usage changes in the future.

The first floor will be a reinforced concrete floor slab. Independent foundations will be provided as necessary for the laboratory equipment requiring no external vibrations.

4-4-2 Foundation System Planning

The excavation bottom level will be that acquired by cutting taffaceous sand stone a little which lies within one meter depth in the existing ground, according to the result of a boring core sampling in March. As the excavation bottom is not expected to be flat, it will be graded with lean concrete to make the foundation bed flat.

For calculation purposes, permissible soil bearing capacities will be estimated conservatively for the foundations located in the places where the pond is at present. Permissible bearing capacity of the taffaceous sand stone will be assumed to be 25.0 ton/m^2 for designing in areas other than that of the pond.

4-4-3 Design Codes and Regulations

The Philippine code and U.S. code will be applied, with the former having priority. The following codes and regulations will be applied:

- National Structual Code of the Philippines (NSCP)

- Uniform Building Code (UBC)
- ACI Code (Building Code Requirements for Reinforced Concrete)
- Timber Design Specification

4-4-4 Design Loads

Dead Load

Self weight of all structural members, partition walls and materials for finishing work etc. will be included in calculations.

Live Load

Live Load of each room will be as follows, calculated in compliance with NSCP and UBC.

Room	Live Load kg/m^2	Note
Office	300	
Laboratory	300	value may increase for heavy machines
Library	615	includes book shelf load
Lecture Hall	300	
Lavatory	250	
Cafeteria	300	
Corridor & Stair	490	

Earthquake Force

The base shear assumed to act on the structure and distribution of earthquake force to each room will be determined in accordance with NSCP. Base shear V is to be derived by the following formula:

$V = ZIKCSW$

where Z: numerical coefficient depending upon the zone (See Fig. 4-4-1) ZONE 3, therefore Z = 3/4

I : Occupancy importance factor

See Table 4-4-1: I=1.0

K: Horizontal force factor

See Table 4-4-2

K = 1.0 or 0.8

C: Coefficient determined by natural period of the structure must be less than 0.12

$$C = \frac{1}{15\sqrt{T}} \quad \therefore \; T = \frac{0.05hn}{\sqrt{D}}$$

S: numerical coefficient for site-structure resonance

S = 1.5 (in accordance with UBC. Sec. 2312 D)

W: total load for calculation of earthquake force

TABLE 4-4-1
VALUES FOR OCCUPANCY IMPORTANCE FACTOR I

TYPE OF OCCUPANCY	I
Essential Facilities[1]	1.5
Any building where the primary occupancy is for assembly use for more than 300 persons (in one room)	1.25
All others	1.0

[1]See Section 2312 (k) for definition and additional requirements for essential facilities.

TABLE 4-4-2 HORIZONTAL FORCE FACTOR "K" FOR BUILDINGS OR OTHER STRUCTURES[1]

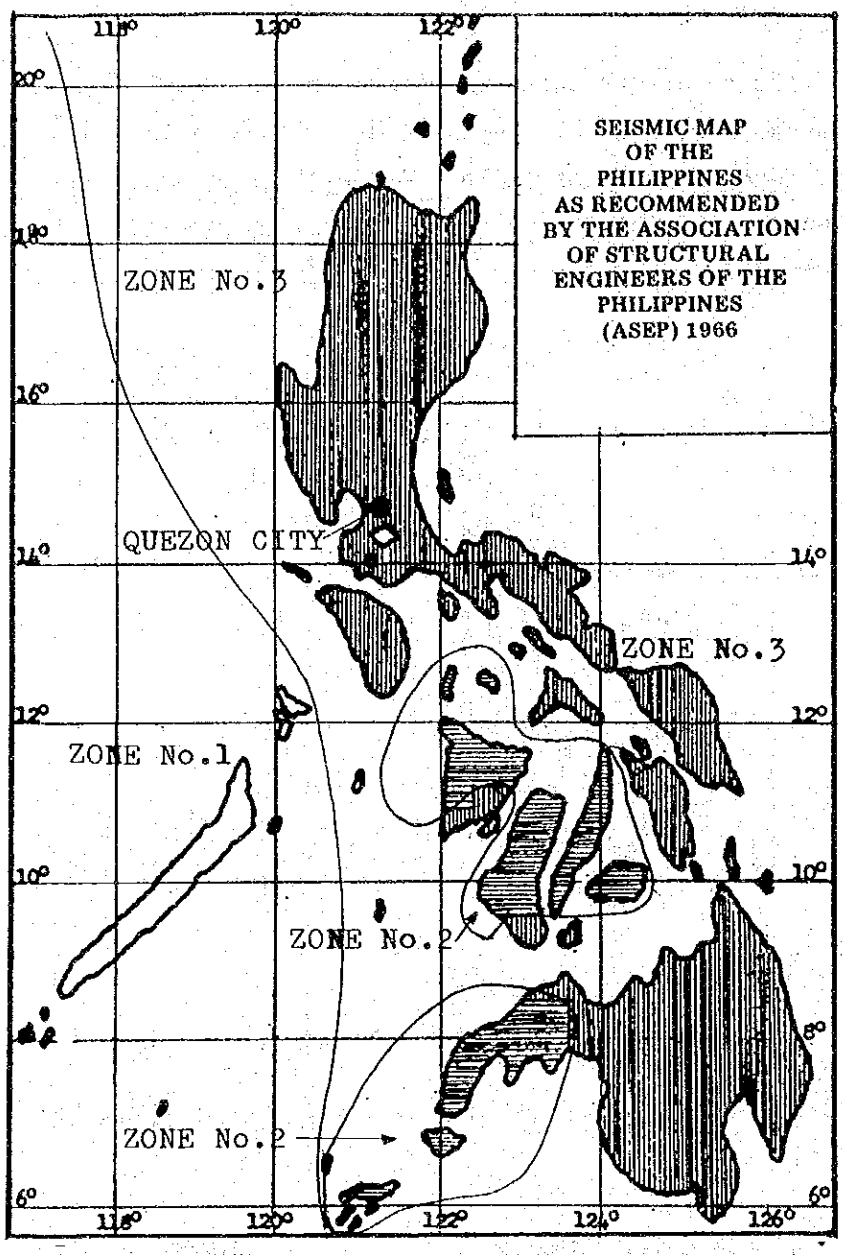
TYPE OR ARRANGEMENT OF RESISTING ELEMENTS	VALUE[1] OF K
1. All building framing systems except as hereinafter classified	1.00
2. Buildings with a box system as specified in Section 2312 (b)	1.33
3. Buildings with a dual bracing system consisting of a ductile moment resisting space frame and shear walls or braced frames using the following design criteria: a. The frames and shear walls shall resist the total lateral force in accordance with their relative rigidities considering the interaction of the shear walls and frames b. The shear walls acting independently of the ductile moment resisting portions of the space frame shall resist the total required lateral forces c. The ductile moment resisting space frame shall have the capacity to resist not less than 25 percent of the required lateral force	0.80
4. Buildings with a ductile moment resisting space frame designed in accordance with the following criteria: The ductile moment resisting space frame shall have the capacity to resist the total required lateral force	0.67
5. Elevated tanks plus fill contents, on four or more cross-braced legs and not supported by a building	2.5[3]
6. Structures other than buildings and other than those set forth in Table No. 23-J	2.00

[1]Where wind load as specified in Section 2311 would produce higher stresses, this load shall be used in lieu of the loads resulting from earthquake forces.

[2]See Figure Nos. 1, 2 and 3 this chapter and definition of "Z" as specified in Section 2312 (c).

[3]The minimum value of "*KC*" shall be 0.12 and the maximum value of "*KC*" need not exceed 0.25.

The tower shall be designed for an accidental torsion of five percent as specified in Section 2312 (e) 5. Elevated tanks which are supported by buildings or do not conform to type or arrangement of supporting elements as described above shall be designed in accordance with Section 2312 (g) using "C_p" = .2.



	ZONE No.1	ZONE No.2	ZONE No.3
Z	3/16	3/8	3/4

Fig. 4-4-1 SEISMIC MAP OF THE PHILIPPINES

Wind Force

The wind force effecting the structure shall be determined in accordance with NSCP. Quezon City belongs in AREA II. (Fig. 4-4-2), therefore, AREA II of Table 4-4-3 will be applied. As for wind pressure coefficients, recommended values prescribed by NSCP will be applied.

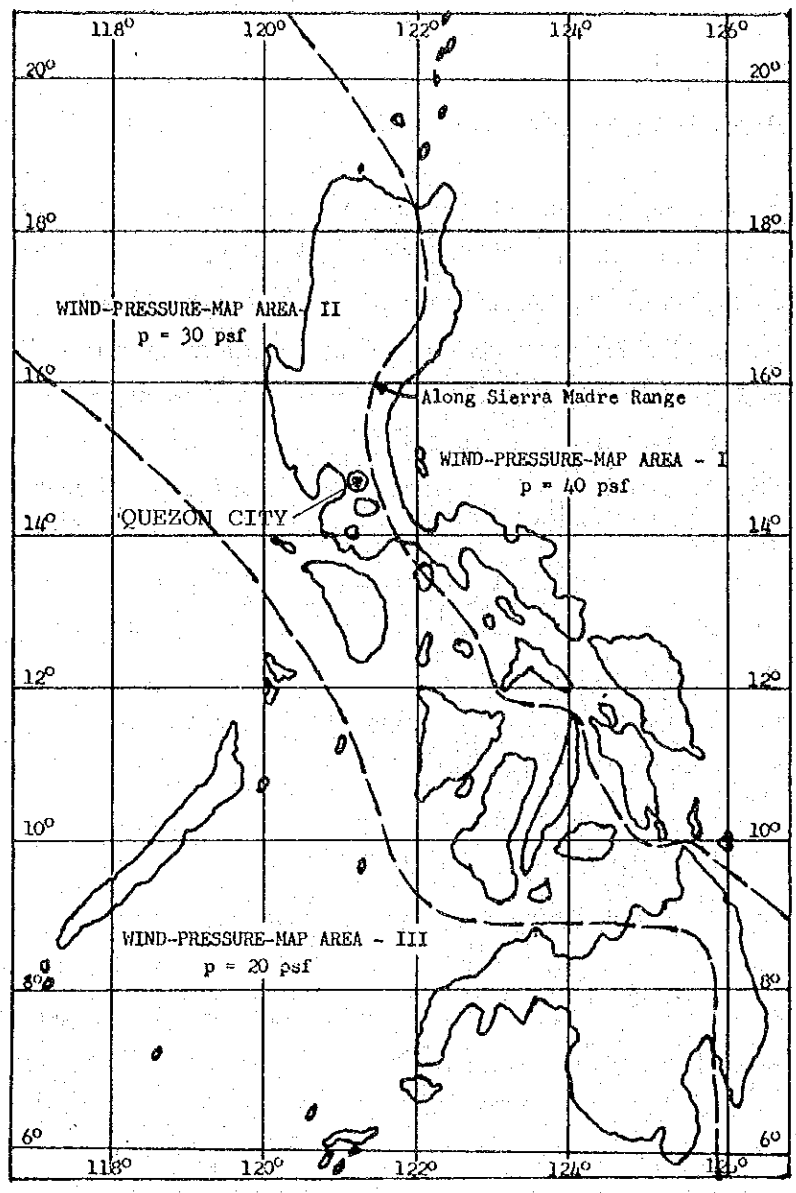


Fig. 4-4-2 WIND-PRESSURE-MAP AREAS FOR THE PHILIPPINES

Table 4-4-3

BASIC WIND PRESSURES FOR DIFFERENT HEIGHTS ZONES ABOVE GROUND FOLLOWING UNIFORM BUILDING CODE HEIGHT ZONES AND PRESSURE VARIATIONS (AUTHOR'S RECOMMENDATION)

HEIGHT ZONE IN FEET	WIND-PRESSURE-MAP AREA		
	AREA - I	AREA - II	AREA - III
Less than 30	30 psf	20 psf	10 psf
30 to 50	40 psf	30 psf	20 psf
50 to 100	50 psf	35 psf	25 psf
100 to 500	60 psf	40 psf	30 psf
500 to 1200	70 psf	45 psf	35 psf
over 1200	80 psf	50 psf	40 psf

Refer to Fig. 4-4-2

4-5 Building Facilities

According to the field survey in Manila, most of the plumbing equipment and machinery will be Japanese made, or Japanese brands manufactured in the Philippines. In planning plumbing equipment and machinery, repair of damaged parts, procurement of accessories, reliability and durability of equipment and machinery after completion of the building construction will be taken into consideration.

Safety and access for maintenance are of importance in the management and control of equipment and machinery after completion.

Design standards of electric, water supply and drainage, air-conditioning and ventilation systems in the Philippines comply with U.S. code requirements.

Generally it will cost less and be more certain to supply equipment and machinery from Japan for plumbing and mechanical requirements.

4-5-1 Water Supply and Drainage System

(1) Water Supply System

Water supply branch pipe will lead from a 300 mm caliber main pipe of the Metropolitan Water Works and Sewage System embedded under North Avenue, south of the site. The existing water feeding pipe is of one (1) inch (25 mm) caliber, which will be replaced by one of 1-1/2 ince (40 mm) caliber. Water will be supplied from a newly installed receiving tank to each necessary place through a pressure type water supply pump.

(2) Warm Water Supply System

A gas water heater shall be installed to supply warm water to necessary places.

(3) Drainage System

The drainage system will be seperated into drainage systems for sewage water, sanitary water, laboratory waste water and rain water. Sanitary water will be discharged through a septic tank, while sewage water, laboratory waste water and rain water will be discharged in the open canal.

(4) Gas System

Propane gas supplied by the Manila Gas Company will be provided

to the site, and distributed to necessary places through a central gas distribution system.

4-5-2 Air-conditioning and Ventilation system

An air condtioning system for cooling only will be provided. Two types of the air-conditioners; one for personnel in the common rooms (minimal area) and the other for the laboratory equipment are to be installed.

Air-conditioning will be of the fan coil unit system and fresh air intake system. Ventilation will be basically of a mechanical ventilation system.

4-5-3 Electric system

(1) Electric Power Supply

A 100 KVA 3 ϕ 220 V line leads into the site from the MERALCO power line under North Avenue, south of the site at present. Transformer bank is MERALCO's. Existing transformer bank shall be replaced by one of 300 KVA and electric power supply shall be provided by the same system. The power line will lead overhead until the first post in the site, beyond which it will be fed underground to each distribution board through the main switch and distributed to each power supply system and the general lighting system.

(2) Power Supply Facilities

Power supply facilities include air cooling equipment for each room, power supply for the laboratories and a pressure system water supply pump. A distribution board will be installed in each zone, which supplies power through local switches for each power supply.

(3) Lighting Equipment

Fluorescent lamps will be used for the most part, and otherwise incandescent lamps.

(4) Plugs and Sockets

1 ϕ 220 V receptacle plugs and sockets will be installed at necessary places in each room.

(5) Weak Current Electric System

1. Telephone System

Two circuits will be newly installed and lead from the main

cable of Philippine Long Distance Telephone Company running overhead along North Avenue, south of the site. The telephone system will have extensions to allow station-to-station calls within the building.

the building.

2. Fire Alarm System

A piezo-electric soft type fire alarm will be installed in common rooms to control fires.

(6) Emergency Generating System

A diesel engine type generator using light oil with about 100 KVA capacity will be installed as the emergency generating system in order to ensure minimal supply for power, lighting system and laboratory use in case of service failure.

4-6 Laboratory Equipment Planning

For the selection of the laboratory equipment for research and analysis, based on the request from the Philippines, utility, simplicity and a minimal possibility of malfunction is essential. Electric computer system which would easily go out of order in case of voltage fraction has been excluded as much as possible.

List of Laboratory Equipment

Following laboratory equipment is planned to be installed provided the project is realized.

1. Mass spectrometer (Gas)
2. Ar. extraction unit
3. Cl4 analyzer
4. Sample preparation unit for Cl4 analyzer
5. Gas chromatograph
6. X-ray diffractometer
7. X-ray fluorescence analyzer
8. Set of equipment for paleomagnetic determination
9. Sample crushing and grinding equipment
10. Atomic absorption
11. Automatic thin sectioning machine
12. Platinum cruicibles with cover
13. Platinum dishes
14. Standard glasswares for wet chemical laboratory
15. Lot of standard chemical laboratory equipment
16. Digital analytical balance
17. Dark room equipment for photo processing and printing

18. Diamond cutting machine

19. Isodynamic magnetic separator

20. Semi-precious stone preparation equipment

21. Microscopic reflectance meter

22. Refrigerator freezer

23. Copying machine

24. Cameras for laboratory use

25. Overhead projector

26. Sound slide projector

27. Electric typewriter

28. Calculator

29. Laboratory furniture

30. Land cruiser

31. Diesel sedan

32. Micro hardness tester

In addition to the above equipment, the following ones were also requested.

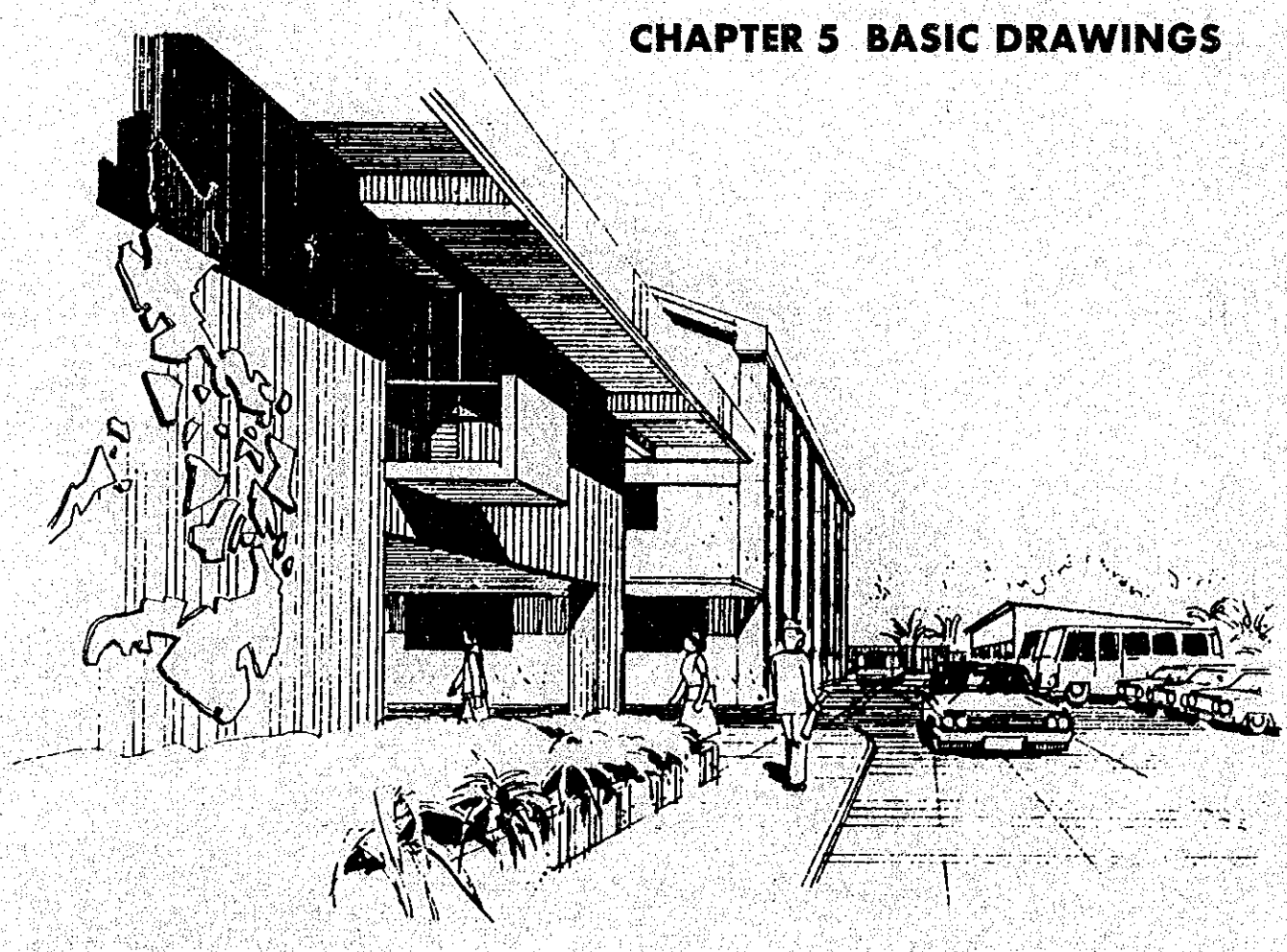
33. Binocular microscope

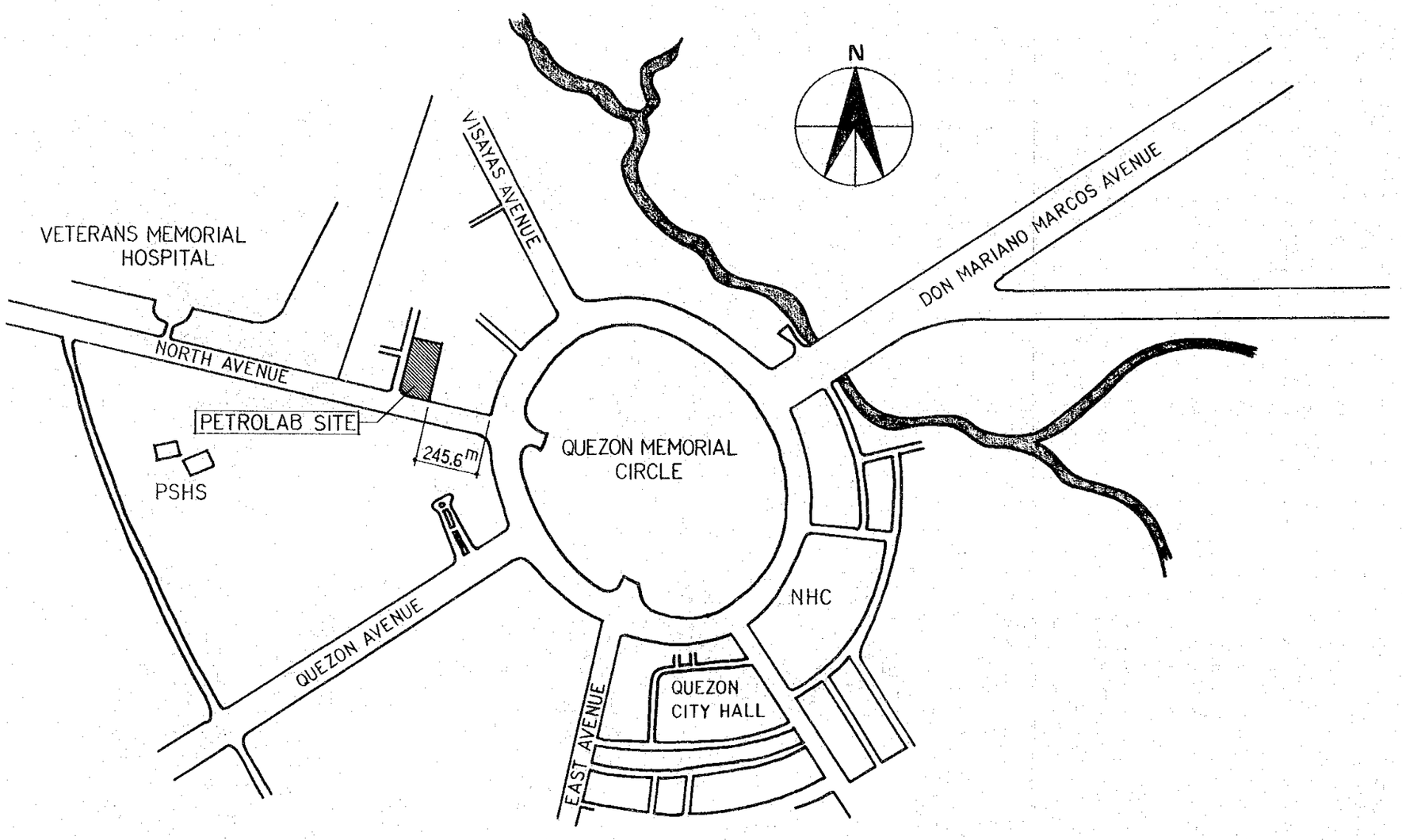
34. Tambling machine

35. Cabbing machine

36. Magnetic susceptibility meter

CHAPTER 5 BASIC DRAWINGS



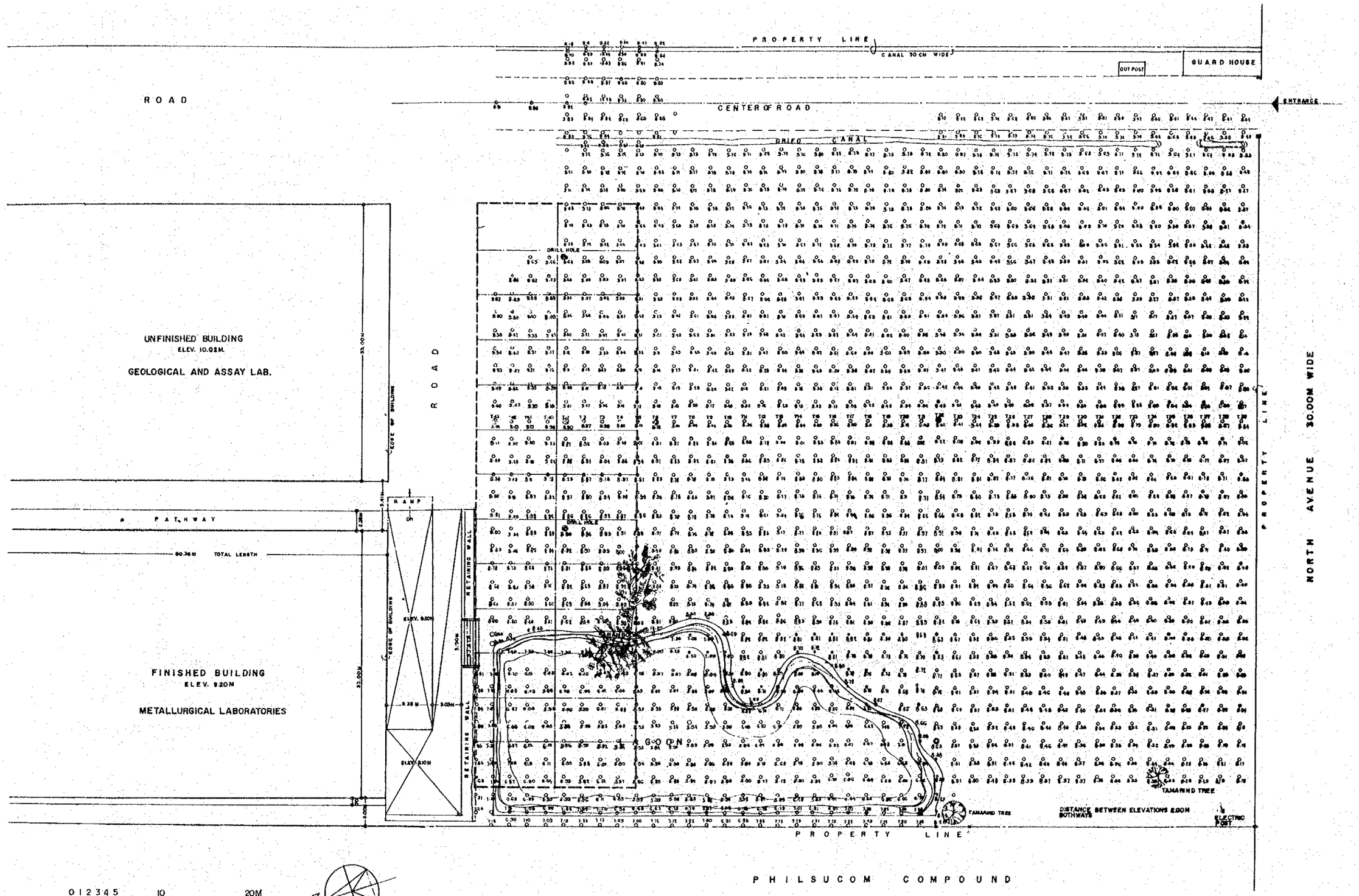


LOCATION MAP

SITUATED AT

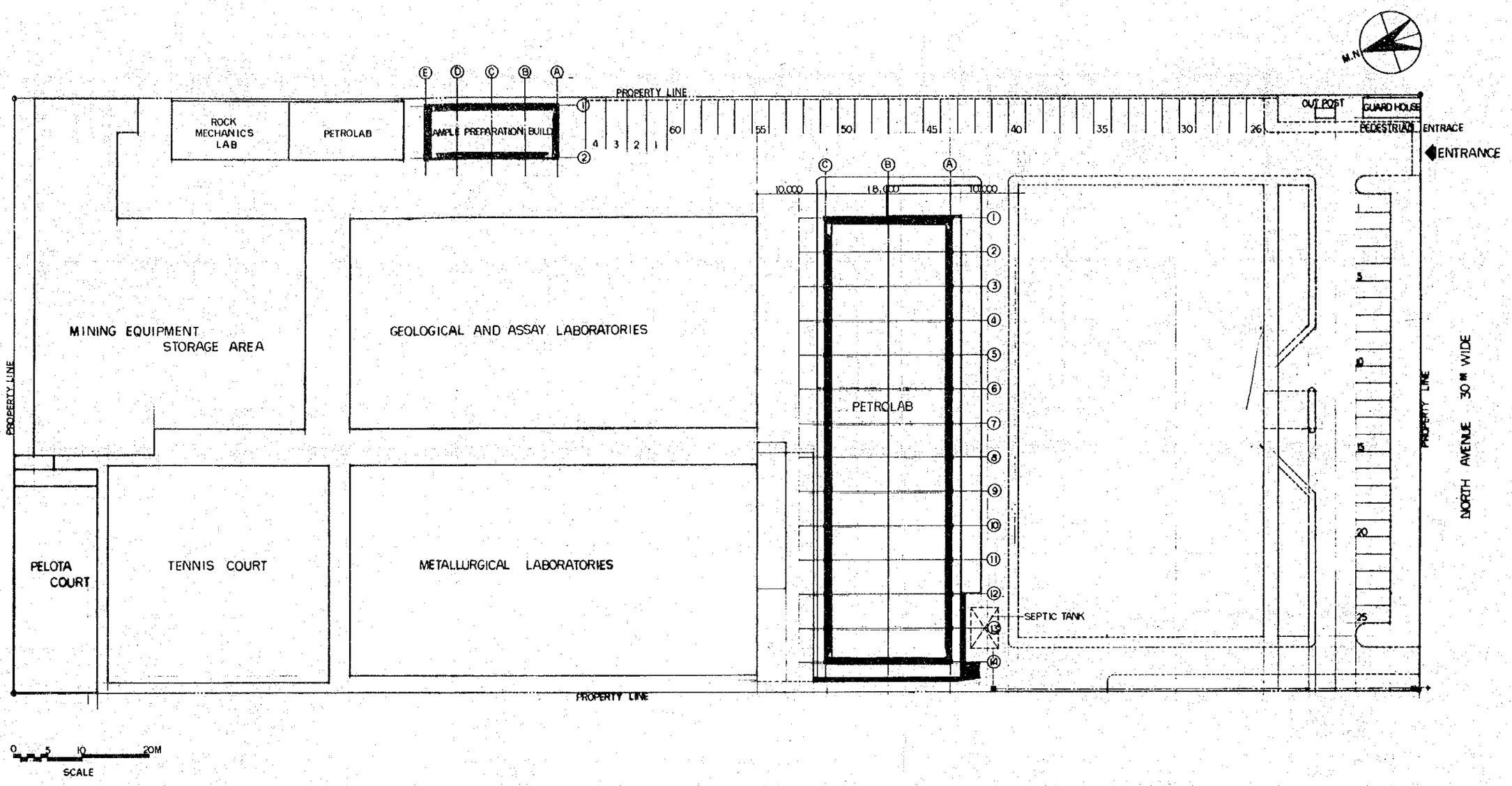
NORTH AVENUE DILIMAN QUEZON CITY

METRO MANILA PHILIPPINES

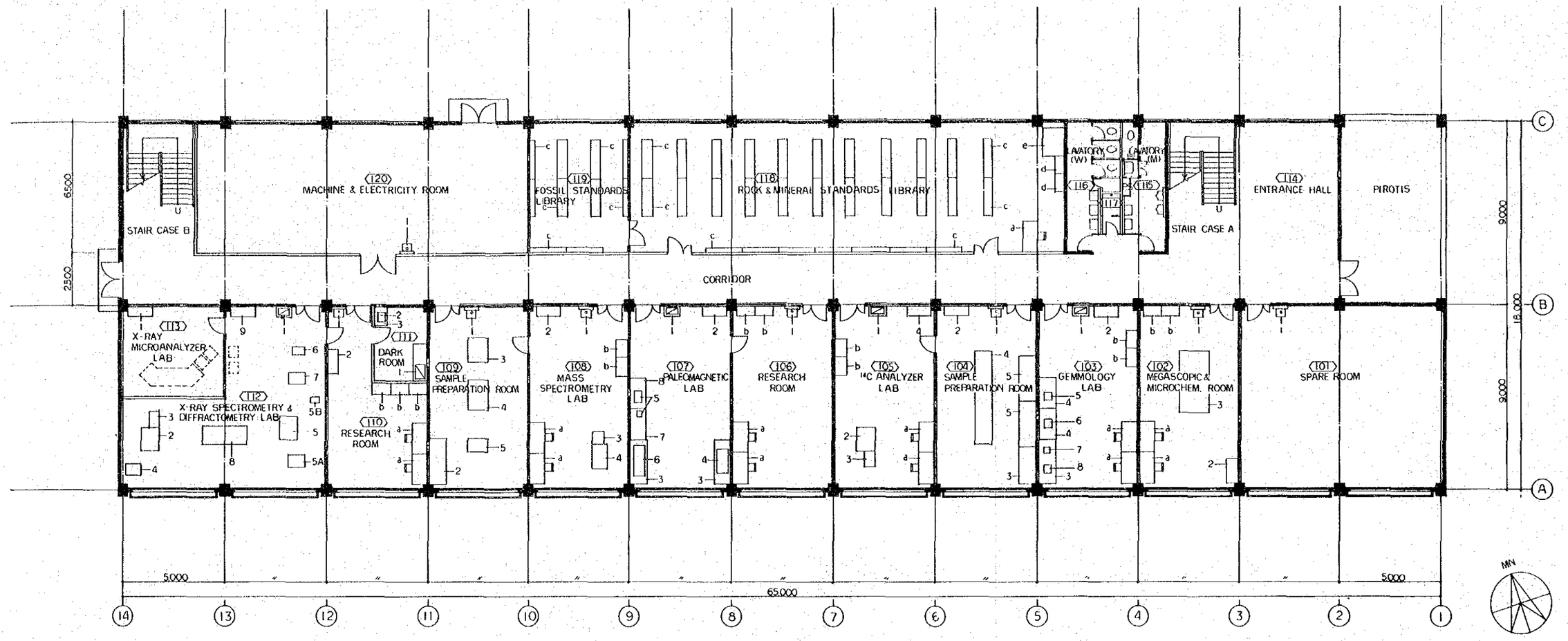


TOPOGRAPHIC PLAN

TOPOGRAPHIC PLAN 02


M.N
PROPERTY LINE
ROCK MECHANICS LAB
PETROLAB
SAMPLE PREPARATION BUILD.
OUT POST
GUARD HOUSE
PEDESTRIAN ENTRACE
ENTRANCE
MINING EQUIPMENT STORAGE AREA
GEOLOGICAL AND ASSAY LABORATORIES
PETROLAB
PELOTA COURT
TENNIS COURT
METALLURGICAL LABORATORIES
SEPTIC TANK
NORTH AVENUE 30 M WIDE
PROPERTY LINE
PROPERTY LINE
0 5 10 20M
SCALE

SITE PLAN 03



GROUND FLOOR PLAN

〈112〉 X-RAY SPECTROMETRY & DIFFRACTOMETRY LAB
1 SINK
2 X-RAY GENERATOR
3 CONTROL DATA PROCESSING UNIT
4 FORCED COOLING WATER CIRCURATION
5 X-RAY SPECTROMETER
5A X-RAY GENERATOR
5B VACUUM SYSTEM
6 AUTOMATIC SAMPLE PRESS
7 FUSION MACHINE
8 SUB TABLE
9 STORAGE

〈113〉 X-RAY MICROANALYZER LAB
1 STORAGE

〈110〉 RESEARCH ROOM
1 WASH BASIN
2 STORAGE
a DESK & CHAIR
b LOCKER

〈111〉 DARK ROOM
1 SINK
2 ENLARGER
3 WOODEN TABLE

〈120〉 MACHINE & ELCTRICITY ROOM
1 WASH BASIN

〈108〉 MASS SPECTROMETRY LAB
1 WASH BASIN
2 STORAGE
3 ELECTRONICS
4 SAMPLE PREPARATION UNIT
a DESK & CHAIR
b LOCKER

〈109〉 SAMPLE PREPARATION ROOM
1 WASH BASIN
2 SUB TABLE
3 Ar EXTRACTION MAIN BODY
4 HIGH FREQUENCY FURNACE
5 VACUM PUMP

〈118〉 ROCK & MINERAL STANDARDS LIBRARY
a DESK & CHAIR
c STEEL RACK
d INDEX CABINET
e MAP CASE

〈119〉 FOSSIL STANDARDS LIBRARY
c STEEL RACK

〈106〉 RESEARCH ROOM
1 WASH BASIN
a DESK & CHAIR
b LOCKER

〈107〉 PALEOMAGNETIC LAB
1 SINK
2 STORAGE
3 SUB TABLE
4 SPINNER MAGNETOMETER
5 A-C DEMAGNETIZER
6 THERMAL DEMAGNETIZER
7 WOODEN TABLE

〈116〉 LAVATORY (W)

〈117〉 SHOWER ROOM

〈104〉 SAMPLE PREPARATION ROOM
1 WASH BASIN
2 STORAGE
3 DRAFT CHAMBER
4 GAS PURIFICATION & CONTROL UNIT
5 SUB TABLE

〈105〉 14C ANALYZER LAB
1 SINK
2 LIQUID SCINTILLATION SPECTROMETER
3 COOLING UNIT
4 STORAGE
a DESK & CHAIR
b LOCKER

〈114〉 ENTRANCE HALL

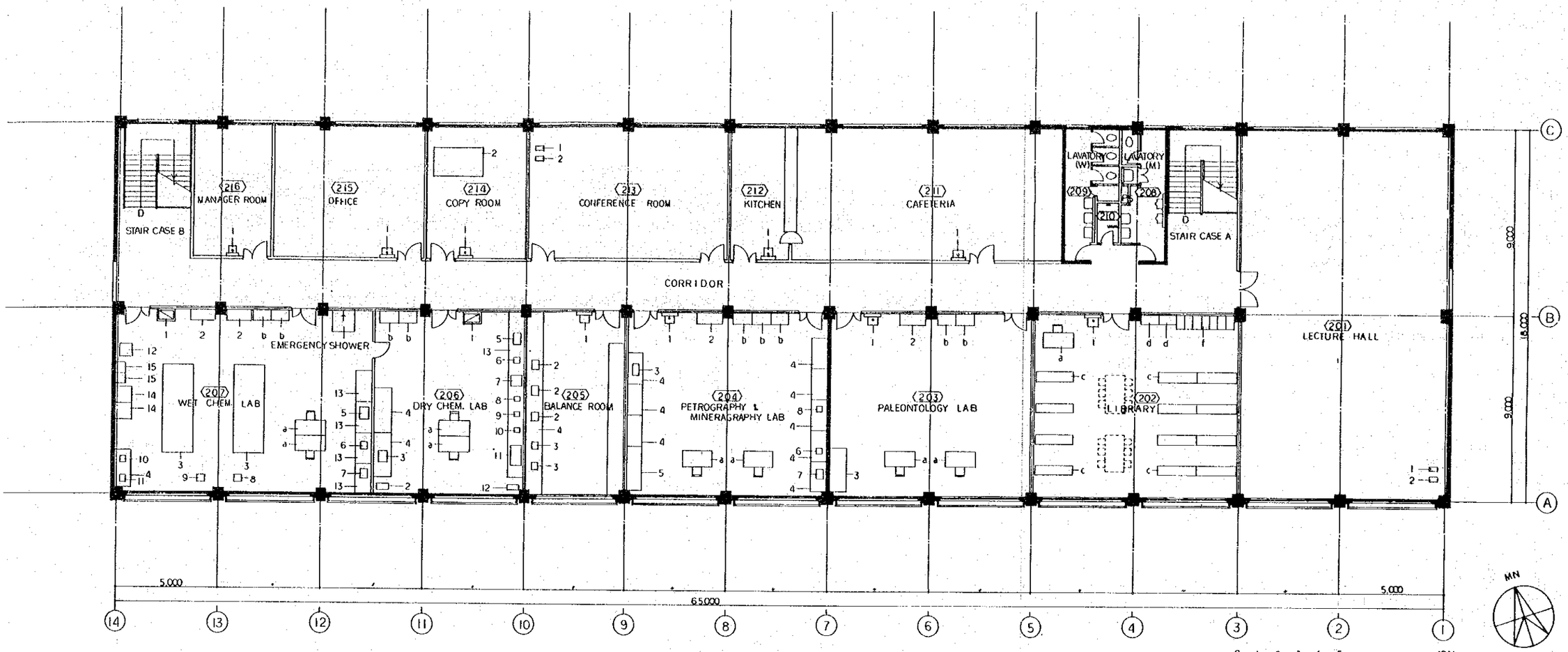
〈115〉 LAVATORY (M)

〈101〉 SPARE ROOM
1 WASH BASIN

〈102〉 MEGASCOPIC & MICROCHEM. ROOM
1 WASH BASIN
2 DRAFT CHAMBER
3 WORK TABLE
a DESK & CHAIR
b LOCKER

〈103〉 GEMMOLOGY LAB
1 SINK
2 STORAGE
3 SUB TABLE
4 WOODEN TABLE
5 FACETING MACHINE
6 MICROSCOPE (FOR PRECIOUS STONE)
7 SMALL TYPE SPECTROMETER
8 ULTRAVIOLET ANALYZER
a DESK & CHAIR
b LOCKER

GROUND FLOOR PLAN 04



SECOND FLOOR PLAN

〈207〉 WET CHEM. LAB
1 SINK
2 STORAGE
3 CENTER
4 DRAFT CHAMBER
5 WATER BATH
6 LOW TEMPERATURE BATH
7 CENTRIFUGE
8 AUTOMATIC SHAKER
9 VACUUM PUMP
10 HOT PLATE (HK 4I)
11 HOT PLATE (HK 2I)
12 REFRIGERATOR FREEZER
13 WOODEN TABLE
14 DISTILLATION UNIT
15 DEMINERALIZER UNIT
a DESK & CHAIR
b LOCKER

〈206〉 DRY CHEM. LAB
1 SINK
2 AIR COMPRESSOR
3 GAS CHROMATOGRAPH
4 SUB TABLE
5 MUFFLE FURNACE
6 COMBUSTION FURNACE
7 DRYING OVEN
8 MERCURY REDUCTION VAPORIZATION UNIT
9 AERSENIC ANALIZER
10 RECORDER
11 ATOMIC ADSORPTION
12 AIR COMPRESSOR
13 CONCRETE TABLE

a DESK & CHAIR
b LOCKER

〈205〉 BALANCE ROOM
1 WASH BASIN
2 DIRECT READING BALANCE
3 ELECTRONIC READING BALANCE
4 CONCRETE TABLE

〈204〉 PETROGRAPHY & MINERAGRAPHY LAB
1 WASH BASIN
2 STORAGE
3 ISODYNAMIC SEPARATOR
4 WOODEN TABLE
5 SUB TABLE
6 POLARI ZING PROJECTOR
7 POINT COUNTER
8 MICRO HARDNESS TESTER

a DESK & CHAIR
b LOCKER

〈203〉 PALEONTOLOGY LAB
1 WASH BASIN
2 STORAGE
3 SUB TABLE

a DESK & CHAIR
b LOCKER

〈202〉 LIBRARY
1 WASH BASIN

a DESK & CHAIR
c STEEL RACK
d FILE CABINET
f INDEX CABINET

〈201〉 LECTURE HALL
1 OVER HEAD PROJECTOR
2 SLIDE PROJECTOR

〈215〉 OFFICE
1 WASH BASIN

〈214〉 COPY ROOM
1 WASH BASIN
2 COPY MACHINE

〈213〉 CONFERENCE ROOM
1 OVER HEAD PROJECTOR
2 SLIDE PROJECTOR

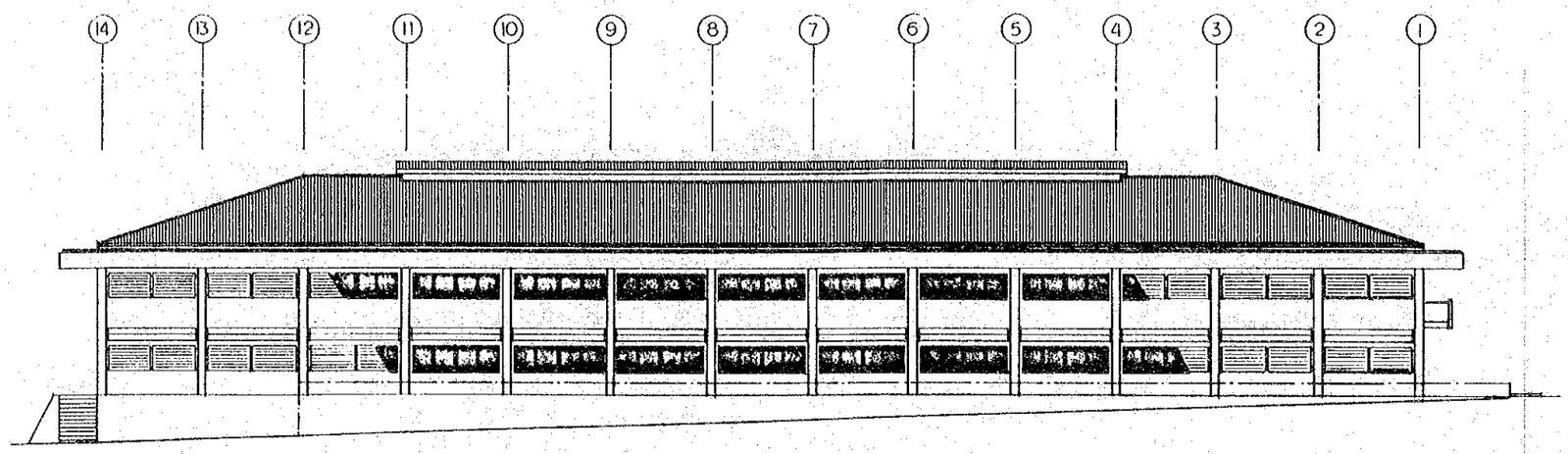
〈212〉 KICHEN
1 WASH BASIN

〈211〉 CAFETERIA
1 WASH BASIN

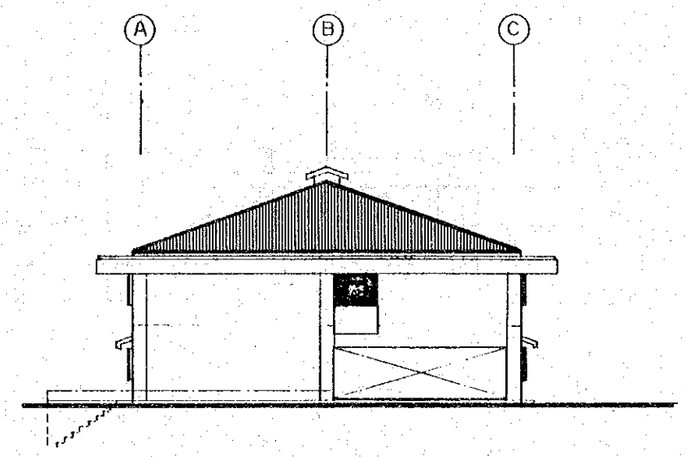
〈208〉 LAVATORY (M)
〈209〉 LAVATORY (W)
〈210〉 SHOWER ROOM

〈216〉 MANAGER ROOM
1 WASH BAIN

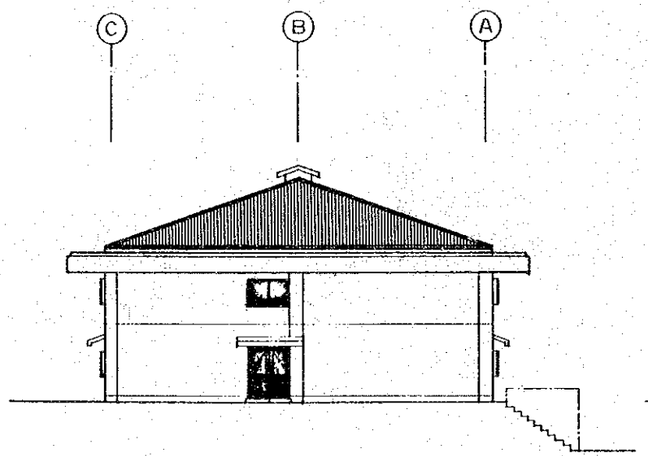
SECOND FLOOR PLAN 05



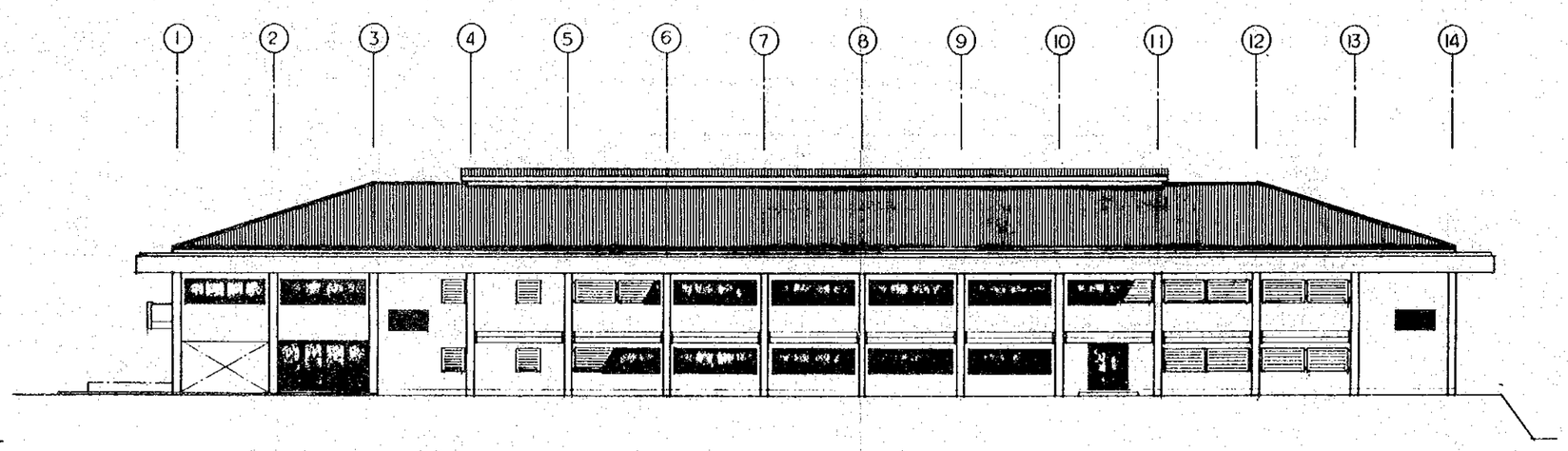
SOUTH ELEVATION



EAST ELEVATION



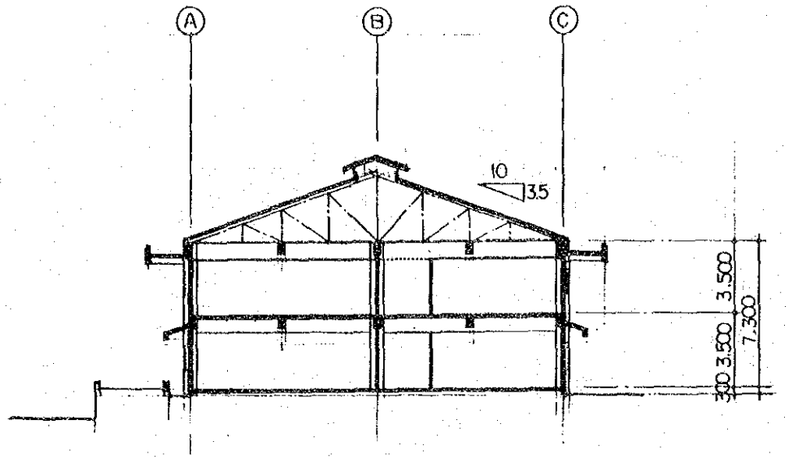
WEST ELEVATION



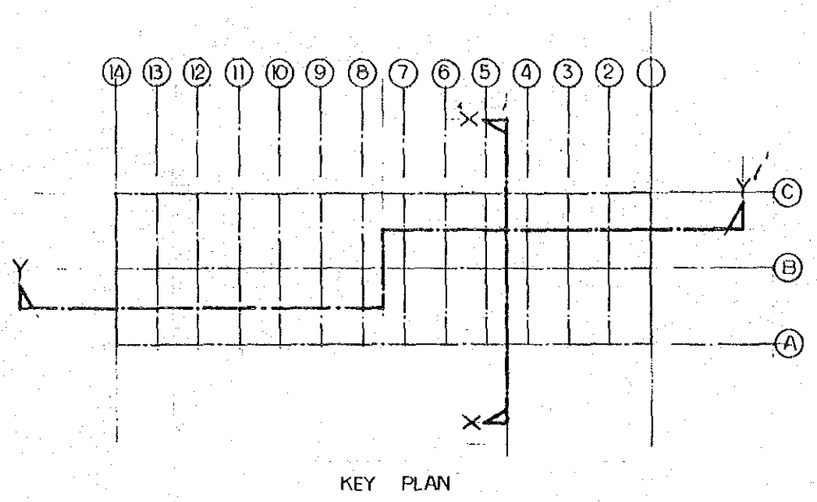
NORTH ELEVATION

0 1 2 3 4 5 10 15M

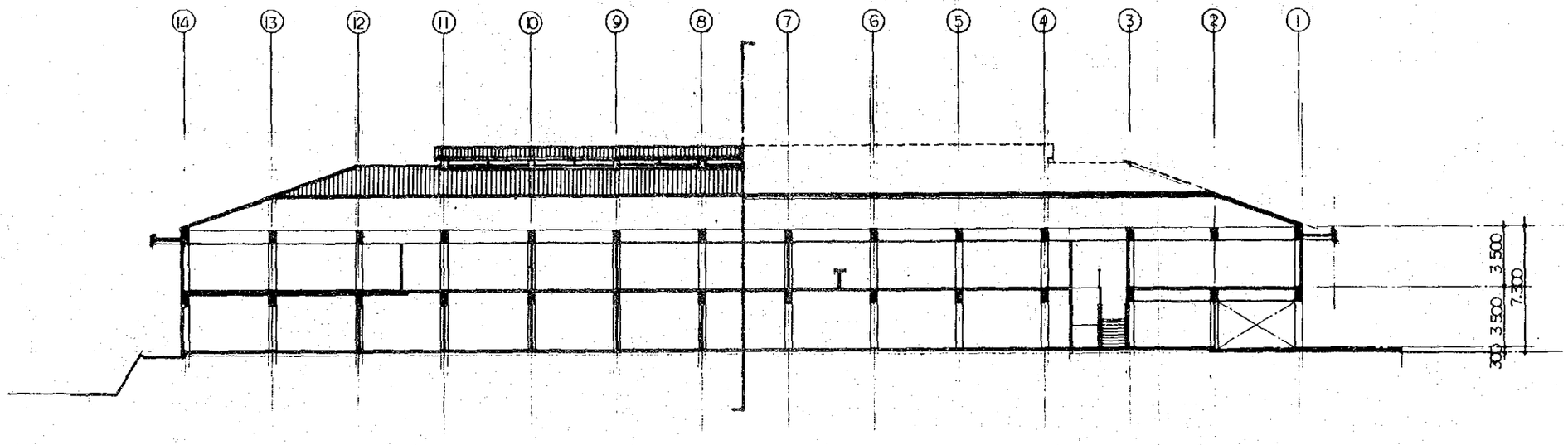
ELEVATION 06



X-X' SECTION

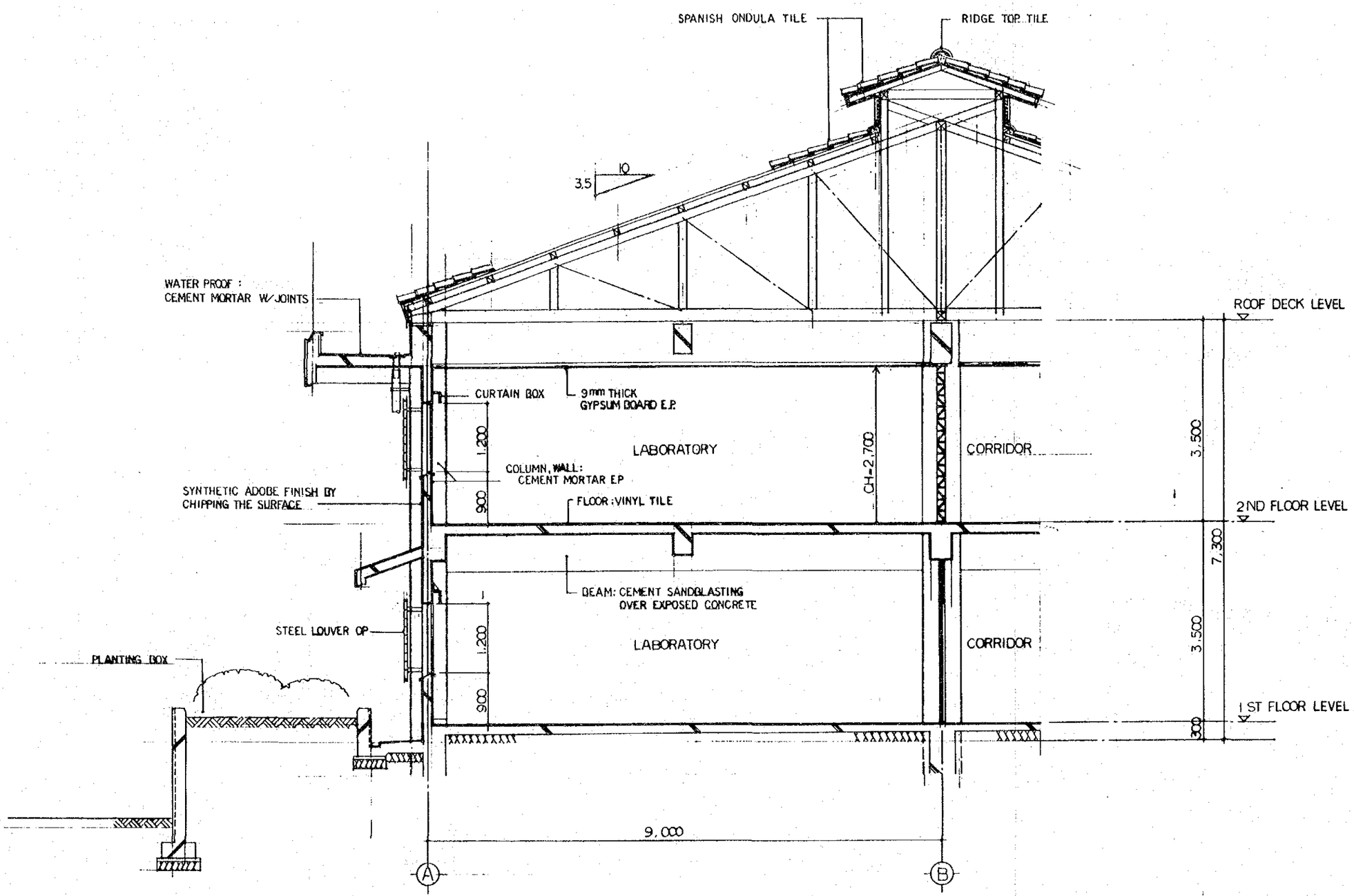


KEY PLAN



Y-Y' SECTION

0 1 2 3 4 5 10 20M



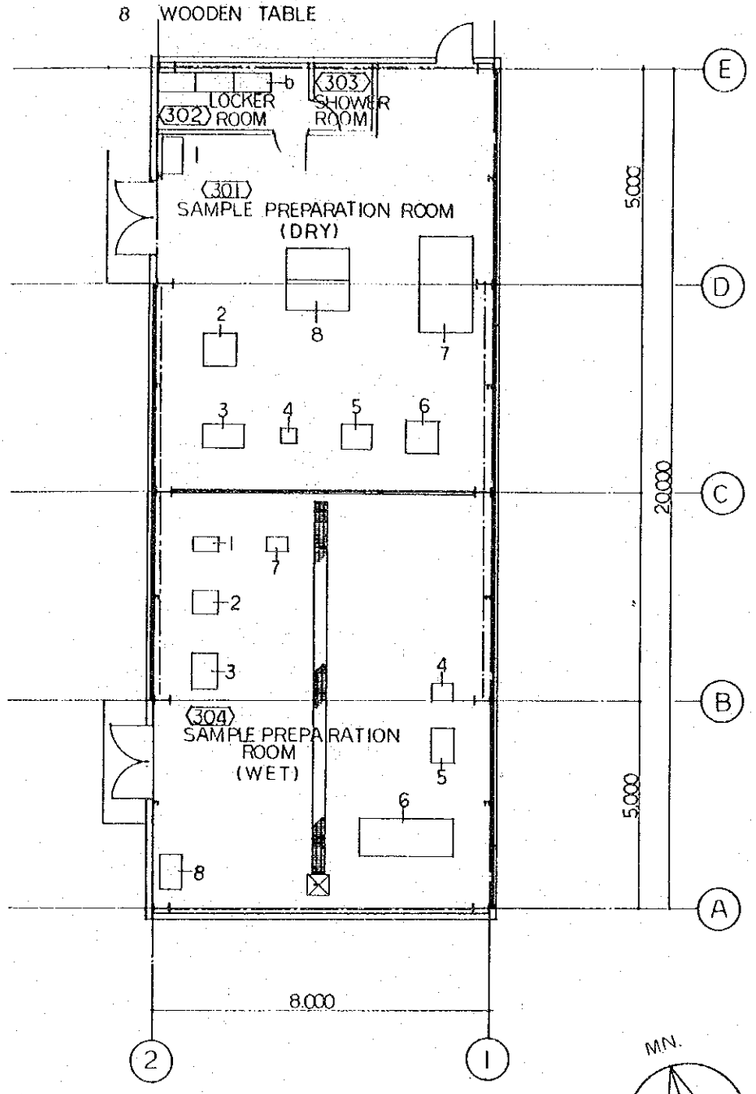
SECTIONAL DETAIL 08

〈301〉 SAMPLE PREPARATION ROOM(DRY)
1 SINK
2 VIBRATION MILL
3 RO-TAP TYPE SIEVE SHAKER
4 MORTOR GRINDER
5 BALL MILL WITH BALL AND ROD
6 JAW CRUSHER
7 CIRCULATION TYPE DRYER
8 WOODEN TABLE

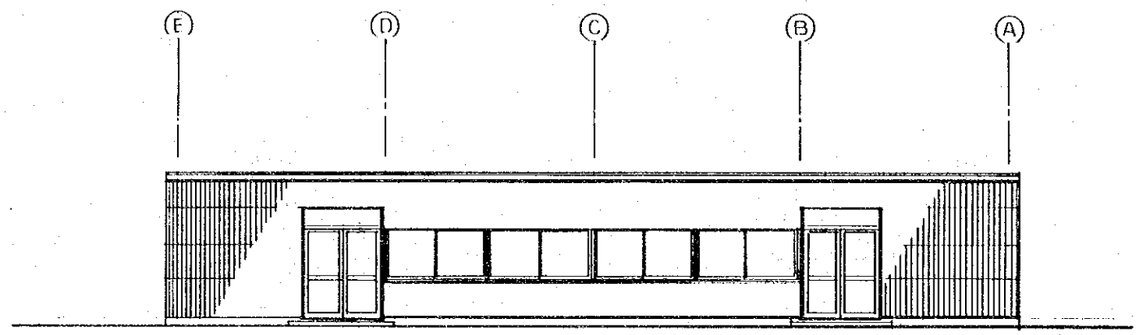
〈302〉 LOCKER ROOM
b LOCKER

〈303〉 SHOWER ROOM

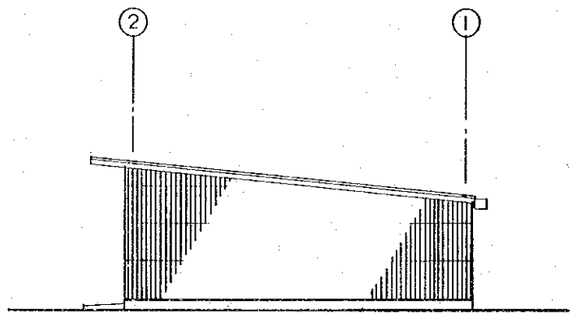
〈304〉 SAMPLE PREPARATION ROOM (WET)
1 TABLE TYPE DIAMOND DRILL
2 POLISHING MACHINE
3 AUTOMATIC TITIN SECTIONING MACHINE
4 TRIM SAW
5 TRIM SAW
6 SLAB SAW
7 TABLE GRINDER
8 SINK



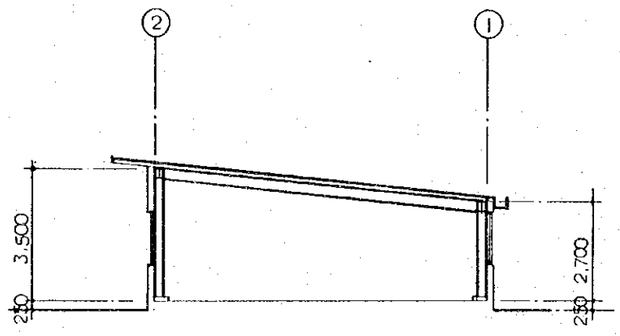
PLAN



WEST ELEVATION



SOUTH ELEVATION



SECTION

0 1 2 3 4 5M

SAMPLE PREPARATION BUILD. 09

CHAPTER 6 PLAN FOR DISPOSITION OF PERSONNEL

CAHPTER 6 PLAN FOR DISPOSITION OF PERSONNEL

The appropriate disposition of personnel for each division and unit to secure the proper operation of PETROLAB is as follows:

(1) Administration and Service Division

A supervising geologist will superintend PETROLAB as the manager who will assume the entire responsibility for the operation.

Under the manager, two (2) cartographers for geological mapping, one (1) building engineer for the operation and maintenance of the building facilities, three (3) clerks, one (1) messenger, and two (2) janitors will be required. (total 10 persons)

(2) Research and Analysis Division

1. Sample Preparation Unit

One senior laboratory technician and three (3) geologic aides under him. (total 4 persons)

2. Megascopic and Microchemical Service Unit

One (1) senior geologist, and two (2) geologists and one (1) geologic aide under him. (total 4 persons)

3. Petrography - Mineragraphy Service Unit

One (1) senior geologist, and three (3) mineralogists under him.

One (1) senior geologist, and three (3) petrologists and two (2) laboratory technicians for operating the laboratory equipment. The supervising geologist I will superintend the unit. (total 11 persons)

4. Mineral Analysis Unit

One (1) team consisting of one (1) research chemist I, one (1) mineral analyst, one (1) laboratory technician for the dry chemical laboratory and two teams of the same composition for the wet chemical laboratory. The research chemist II will superintend the unit. (total 10 persons)

5. X-ray Spectrometry and Diffractometry Service Unit

One (1) supervising geologist I, and one (1) senior geologist, one (1) geologist, four (4) laboratory technicians, and one (1) electrical engineer under him.

If the existing X-ray microanalyzer is transferred to this unit, two (2) more geologist and laboratory technician will be appointed. (total 10 persons)

6. Gemmological Service Unit

One (1) supervising geologist I , and one (1) senior geologist, one (1) geologist and one (1) geologic aide under him. (total 4 persons)

7. Isotope Geochemistry and Geochronology Service Unit, including C14 Analyzer Laboratory and Mass Spectrometry Laboratory

One (1) supervising geologist I, and one (1) senior geologist, two (2) geologists and one (1) electrical engineer under him. (total 5 persons)

8. Paleontological Geochronology Service Unit

One (1) supervising geologist I, and one (1) senior geologist, four (4) paleontologists, and one (1) geologic aide. (total 7 persons)

9. Paleomagnetic Geochronology Service Unit

One supervising geologist I, and one (1) senior geologist, one (1) geologist, one (1) geologic aide and one (1) electrical engineer under him. (total 5 persons)

10. Rock and Mineral Standards Laboratory

One (1) senior geologist, and one (1) geologist and one (1) geologic aide under him. (total 3 persons)

11. Book Reference Library

One (1) senior librarian,and one (1) librarian and one (1) junior librarian under him. (total 3 persons)

Therefore, the total required number of personnel will be as follows:

Supervising Geologist II	1
Supervising Geologists I	6
Senior Geologists	10
Geologists	15
Paleontologists	4
Geologic Aides	8
Research Chemist II	1
Research Chemists I	3
Mineral Analysts	3
Senior Laboratory Technician	1
Laboratory Technicians	9

Electrical Engineers	3
Cartographers	2
Building Engineer	1
Librarians	3
Clerks	3
Messenger	1
Janitors	2
Total	76

CHAPTER 7 MAINTENANCE COST

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7-1 Maintenance Cost of Laboratories

The annual cost for the maintenace of the laboratory equipment and for miscellaneous consumables ranges approximately between 6,800 and 11,400 dollars per laboratory at the various geological and mineralogical laboratories in Japan. If the average annual cost is estimated about 9,100 dollars, this PETROLAB, consisting of nine (9) laboratories, is assumed to require a total of about 81,900 dollars every year. Considering that the engineers and technicians for maintenance and miscellaneous consumables may be dependent on foreign countries, it is considered very difficult to keep the cost below this amount. (one dollar is converted as 220 yen)

This maintenance cost, however, is expected to be provided from income which PETROLAB will after completion generate from research and analysis ordered by private enterprises. For instance, the supply of rock, mineral and fossil research, analysis and estimation has satisfied only 35 percent of the total demand from 1969 to 1978.

7-2 Running Cost of Building Facilities

The annual electric, gas and water consumption of PETROLAB is estimated as follows under a full operation load (approximate amounts):

electricity	195,900 KW
LPG	600 m^3
water	14,000 m^3

CHAPTER 8
REQUEST TO THE GOVERNMENT OF THE PHILIPPINES

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REQUEST TO THE GOVERNMENT OF THE PHILIPPINES

Following arrangements will be required to be taken by the government of the Philippines if the PETROLAB project is realized.

(1) To secure a lot of land necessary for the construction of facilities and to clear the site.

1. Grading including filling in the existing pond and felling of the existing trees.
2. Incoming of main power feeders to power receiving and substation system.
3. Incoming of telephone piping system to telephone exchanger.
4. Incoming of water main to water receiving tank.
5. Preparation of drainage system including a drain from the first catch basin of the septic tank on the west side to an open canal along North Avenue.

(2) To ensure prompt unloading and customs clearance at ports of disembarkation in the Philippines of the products purchased under the grant.

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

(4) To provide Japanese nationals participating the project under the verified contracts such services and facilities as may be necessary to ensure their safety for entry, exit, movement and stay in the Philippines for the performance of their work.

(5) To provide services by the Philippine counterpart necessary for the completion of the project.

(6) To bear all the expenses necessary for construction of the facilities other than those to be borne by the grant.

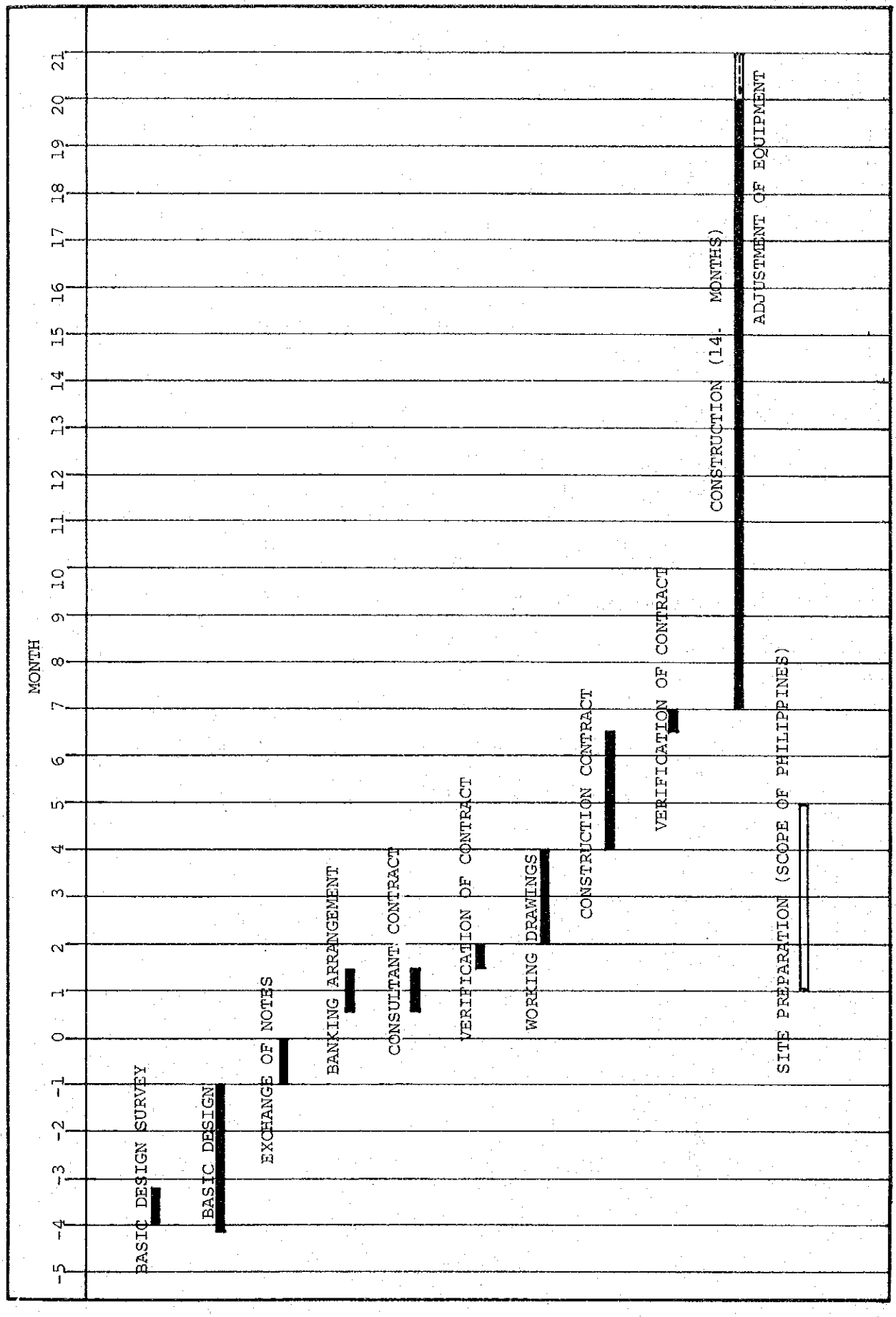
(7) To undertake incidental civil works such as roads within the site, gates, gate offices, parking lots, planting and exterior lighting if needed.

(8) To provide temporary power and water supply during the construction work.

(9) To furnish furniture except that which will be installed under Grant Aid.

CHAPTER 9
TENTATIVE DESIGN AND CONSTRUCTION SCHEDULE

CHAPTER 9
TENTATIVE DESIGN AND CONSTRUCTION SCHEDULE



CHAPTER 10 PROJECT EVALUATION

CHAPTER 10 PROJECT EVALUATION

With its ample resources, the Philippine mining sector shares a very important role in the country's industrialization based on the FYPDP(Five Year Philippine Development Plan). However, no well-equipped laboratory capable of analyzing and studying rocks and minerals to satisfy the mining sector demand has been established yet. In addition, the laboratory equipment of the University of the Philippines which is the center of geoscientific studies has become antiquated.

BMG is required to take the leadership and responsibility concerning geosciences and mining in the Philippines as the authorized agency of the government, but the research facilities of BMG have not yet recovered completely from the damage and loss incurred in the 1976 fire.

The proposed construction project of PETROLAB, which will belong to BMG, is indispensable to meet the government and industry demand regarding the exploration and development of Philippine mineral resources.

The following effects are expected to be realized with the establishment of PETROLAB.

(1) The major mining products produced in the Philippines are copper, eighth in world production volume, gold, seventh, and chromium, fourth. Most of the copper ores in the Philippines are so called porphry copper, which consists of copper ore scattered in rock. It used to be considered difficult to mine porphyry copper economically. As of 1979, mining output was only 0.018 percent of the total estimated deposits of 1,642 million MT.

If analysis of the quality of copper contained and proper exploitation technology of porphyry copper ores are developed, it will be a major contribution to Philippine industry in the future. It will be one of the major purposes of PETROLAB to exploit, by analysis, an economical and technologically feasible mining method of deposits which used to be considered difficult to mine.

(2) The geochronological judgement by mass spectrometer and 14C analyzer utilizing radioactive element included in the rocks enables to judge not only the geological ages but also the new and old and the upper and lower of strata, and to judge the thriving period of rocks and minerals. In this method the theoretical way of inferring the possibility of existing mineral beds can be developed, and the new effective prospect can be expected in the search for the mineral beds.

(3) Precision analysis of the components will also increase the possibility of explorating in existing mines. In this field, PETROLAB will serve to develop a more effective mining technology for existing mines.

(4) Geochronological analyses as well as petrography and minera-graphy is expected to encourage geological mapping throughout the country, something which has just been started. Geological maps are not only important for the mining industry but also give a basic direction for the construction of dams, roads and railways.

Geological maps are not only important for the mining industry but also give a basic direction for the construction of dams, roads and railways.

(5) As is stated in Chapter 2, there is a gap in the Philippine geosciences between the leading and younger scientists, and those who deal with research and analysis are not very experienced. In this situation, establishing a services laboratory in BMG, the center of the applied geoscientific field, will provide practical educational training for young scientists and will result in contributing to an upgrading of geoscientific study in the Philippines.

(6) According to the data for the 10 year period from 1969 to 1978, geological studies such as petrological, mineralogical and geochronological analyses, including the appraisal of fossils, has satisfied only one-third of the total demand requested by the government and private enterprises. This demand has been increasing every year. It should be emphasized that PETROLAB will meet this urgent nation-wide demand.

(7) The Philippine mining industry contributes to government finances in terms of mining taxes and acquiring foreign currencies by the export of mineral products as well as developing facilities in the infrastructures and increasing the number of employed workers by developing new mines. The GNP in 1979 for the Philippines is estimated to be 11,720 million dollars of which secondary industries account for 35.2 percent. The mining industry accounts for 2.46 percent. The growth rate of the mining industry during the 10 years till 1979 soared by 94.8 percent, while that of the GNP was 73.3 percent. In terms of foreign currency earnings, the mining industry makes up 14.9 percent of the total earnings in 1978. This demonstrates how much is expected of the mining industry and how much it actually contributes to Philippine industry. PETROLAB is expected to remove one of the burdens imposed on mining industry and to accelerate its development.

CHAPTER 11 RECOMMENDATIONS

CHAPTER 11 RECOMMENDATIONS

The basic design survey team has the following recommendations concerning the construction project of the Petrological, Mineralogical and Geochronological Services Laboratory (PETROLAB) to the Philippine authorities concerned. They are indispensable:

(1) care in the maintenance after completion as well as setting aside adequate funds for maintenance of the laboratory equipment, building and building facilities,

(2) ensuring the procurement of the required number of the staff, scientists, engineers and assistants, and arranging them in appropriate positions in order to manage and control PETROLAB,

(3) carrying out a long-term technical training program for the continuous training of young scientists who will carry on research and analyses using the laboratory equipment, and

(4) carrying out the technical training of young technicians who will support the laboratory, such as electronics engineers, chemical analysis technicians and those who deal with preparation sampling and making glass-ware for laboratory use

It is also suggested that appropriate steps be taken to ensure an adequate number of permanent personnel including the scientists and technicians who finish training or are on training because the proper management of PETROLAB will be highly dependent on their capability, knowledge and technique.

ANNEX I REFERENCES

ANNEX I REFERENCES

I-1 Basic Design Survey Team

I-1-1 Member of the Survey Team

Leader : Mr. Masayoshi Enomoto
Grant Aid Div. Grant Aid and Procurement Dept., JICA

Mr. Shoji Yamamoto ; Architecture
Deputy Head, Architecture and Engineering Dept.
Yokogawa Architects & Engineers, Inc.

Mr. Takeo Eto ; Structural Engineering and Cost Estimation
Chief of Overseas Project, Yokogawa Architects & Engineers, Inc.

Mr. Ryoichi Kibe ; Mechanical Engineering and Cost Estimation
Chief Engineer, Yokogawa Architects & Engineers, Inc.

Dr. Akio Maru ; Laboratory Equipment
Non-regular staff, Mineralogical Analysis
Yokogawa Architects & Engineers, Inc.

Mr. Seiji Kaiho ; Coordination
Development Survey Div., Social Development Dept., JICA

Philippine Representatives

NEDA (National Economy and Development Authority)

Mr. Corpus	Assistant Minister

Ministry of Natural Resources

Mr. Dakila B. Fonacier	Assistant Minister

BMG (Bureau of Mines and Geosciences)

Mr. Juanito Fernandez	Director
Mr. Francisco Comsti	Assistant Director
Mr. Oscar Crispin	Chief Geologist
Dr. Guillermo Balce	Geologist
Mr. Juan E. Pilac	Geologist
Mr. Conrado Miranda	Geologist

University of the Philippines

Dr. Rogelio Datuin	Professor of Div. of Geosciences

I-1-2 Schedule of the Survery Team Activities

1st day	March 2 (Mon.)	14:00 Dpt. Narita Flt. PR431 17:25 Arv. Manila
2nd day	March 3 (Tues.)	Manila office of JICA Japanese Embassy Visit to BMG Visit to Ministry of Natural Resources BMG Quezon Site survey (1st time)
3rd day	March 4 (Wed.)	Visit to National Economy and Development Authority (NEDA) First conference with BMG
4th day	March 5 (Thu.)	Second conference with BMG BMG Quezon Site survey (2nd time) Meeting with BMG about equipment details
5th day	March 6 (Fri.)	Interim report to Japanese Embassy and JICA Manila office
6th day	March 7 (Sat.)	Staff meeting
7th day	March 8 (Sun.)	Data analysis
8th day	March 9 (Mon.)	Interim report to JICA Manila office Meeting with BMG about equipment details Field survey of Technical University of the Philippines
9th day	March 10 (Tues.)	Signing of Minutes of Discussions Visit to local design office Site survey in Manila
10th day	March 11 (Wed.)	Leader of the survey team returns to Japan Meeting with BMG about equipment details (3rd time) BMG Quezon Site survey (3rd time) Attendance at boring
11th day	March 12 (Thu.)	Field survey of Bureau of Forest Department, Training Center for Forest Conservation in Pantabangan
12th day	March 13 (Fri.)	Visit to local design office Re-examination of survey principle
13th day	March 14 (Sat.)	Data analysis Invitation to the 35th conference of the Geological Society of the Philippines (Dr. Maru)
14th day	March 15 (Sun.)	Data analysis Field survey of the Division of Geosciences of the University of the Philippines
15th day	March 16 (Mon.)	Field survey of Quezon City Hall, Metropolitan Waterworks and Sewage System, Highway District Engineers Office Meeting with BMG about equipment details (4th time)

16th day	March 17 (Tues.)	BMG Quezon Site survey (4th time) Research of existing facilities and designing of boring pits Field survey of Philippine Long Distance Telephone Company and Manila Electric Company Construction site survey
17th day	March 18 (Wed.)	Research of existing laboratories in BMG, Manila Site Field survey of Manila Gas, Pollution Control Authority, Manila International Airport and Manila Port Research of construction plants: concrete block and ready-mixed concrete manufacturing plant, PS concrete and aluminum producing plant
18th day	March 19 (Thu.)	Visit to BMG for leaving the Philippines Visit to local design office Research of construction plants: structural steel fabricating plant, lumber mill, architectural metals processing plant Meeting with BMG about equipment details (5th time)
19th day	March 20 (Fri.)	Meeting with BMG about equipment details (6th time) Visit to local design office Research of furniture costs
20th day	March 21 (Sat.)	Data analysis
21st day	March 22 (Sun.)	8:00 Dept. Manila Flt. PR432 12:40 Arv. Narita

I-1-3 Problems and Details of Discussions

(1) Problems of the Laboratory Equipment

This Project is to establish a Petrological, Mineralogical and Geochronological Services Laboratory (PETROLAB). Petrology is the science of rock study, mineralogy the study of mineral crystals in ores, and geochronology, including paleontology, the study of fossils, judges the order of strata and/or geochronological age of them; thus, geochronology is basic to the other two sciences.

Judging from information acquired in Japan, it is considered that the Philippines' level in petrology and mineralogy is high, with ample manpower and enough capability for operating and utilizing the requested laboratory equipment efficiently and effectively. However, there are only a few scientists in the field of geochronology and paleontology. It is not certain if the universities in the Philippines offer courses in this field. Therefore it was decided to exclude these three machines:

(i) Mass Spectrometer (Gas)
(ii) Mass Spectrometer (Solid) and
(iii) Cl4 Analyzer

from the proposed list of requested laboratory equipment for the following reasons:

(i) there is a lack of scholastic background in the country
(ii) these machines are expensive and require a high level of technology for operation
(iii) a mass spectrometer would have to be imported from a country other than Japan because there are no appropriate Japanese mass spectrometers, and this might cause trouble with proper maintenance after installation

(2) Details of Discussions on Problems of the Laboratory Equipment

March 3 Visit to BMG. The Japanese basic survey team explained the problems described above and the policies of the government of Japan.

March 4 First conference with BMG. BMG presented and explained data concerning their Program of Manpower Recruitment.

BMG has been carrying on a systematic training program since 1977 using BMG scholarships as well as within the Colombo Plan, aided by scholarships from the ministry of Education, the government of Japan etc. Twenty two BMG, employees have finished or are now studying abroad.

In the field of geochronology, four (4) students noted below are now abroad and will be back home by 1982 in time for the completion of PETROLAB. The program of manpower recruitment will be continued.

country	year of return	No. of students
Australia	1982	one (1)
South Korea	1980	"
West Germany	1981	"
"	1982	"

BMG also explained that the three (3) machines specified above are ranked in the first group of the list of laboratory equipment requested because they are in wide demand in government and industry and are indispensable for urgently required geologic mapping of the Philippines as well as the measurement of geochronological age, a basic procedure in petrology and mineralogy.

March 5 Second conference

The following two items were proposed by the Basic Design Survey Team and agreed upon.

(i) The mass spectrometer (solid) and Cl4 analyzer shall be excluded from the list of laboratory equipment to be granted.

(ii) The mass spectrometer (gas) is hold over and will be considered and decided on in Japan.

March 6 Third conference

BMG requested that the Cl4 analyzer be included in the list of laboratory equipment granted explaining that the Cl4 analyzer is in wide demand as it would assure an effective exploration for bauxite, manganese, and chromite, etc., all fairly plentiful and geologically recent in the Philippine minerals. Discussion was concluded as follows:

(i) The mass spectrometer (solid) shall be excluded from the list of laboratory equipment granted.

(ii) The questions of the mass spectrometer (gas) and Cl4 analyzer are held over and shall be considered and decided on in Japan.

I-1-4 Second Mission for Draft Report

(1) Member of the Mission

Leader : Mr. Masayoshi Enomoto; JICA

Mr. Shoji Yamamoto; Yokogawa Architects & Engineers, Inc.

Mr. Ryoichi Kibe; Yokogawa Architects & Engineers, Inc.

(2) Schedule of the Mission

1st day	May 11 (Mon.)	14:00 Dpt. Narita Flt. PR431 17:25 Arv. Manila
2nd day	May 12 (Tues.)	Manila office of JICA Japanese Embassy First conference with BMG
3rd day	May 13 (Wed.)	Second conference with BMG
4th day	May 14 (Thu.)	Signing of Minutes of Discussions Manila office of JICA Japanese Embassy BMG Quezon Site survey Visit to Manila Electric Company
5th day	May 15 (Fri.)	Third conference with BMG Manila office of JICA
6th day	May 16 (Sat.)	8:00 Dpt. Manila Flt. PR432 12:40 Arv. Narita

MINUTES OF DISCUSSIONS
O N
THE CONSTRUCTION PROJECT OF PETROLOGICAL, MINERALOGICAL AND GEO-CHRONOLOGICAL SERVICES LABORATORY IN THE REPUBLIC OF THE PHILIPPINES

In response to the request made by the Government of the Republic of the Philippines for the basic design study on the construction project of petrological, mineralogical and geo-chronological services laboratory in the Republic of the Philippines (hereinafter referred to as "the project"), the Government of Japan has dispatched, through Japan International Cooperation Agency, a survey team headed by MR. MASAYOSHI ENOMOTO, staff of Japan International Cooperation Agency, to carry out the basic design study from March 3, 1981.

The team has conducted field survey and held a series of discussions and exchanged views with the Philippine authorities concerned as to the Project.

As a result of the survey and discussions, the Japanese Survey Team and the Philippine Authorities Concerned agreed to recommend to their respective governments to examine the results of the discussions attached herewith toward the realization of the Project.

March 10, 1981

MR. MASAYOSHI ENOMOTO
Leader of the Japanese
Basic Design Survey Team

MR. JUANITO C. FERNANDEZ
Director of the Bureau
of Mines and Geo-Sciences

1. Government of the Republic of the Philippines has already acquired the land as the proposed site for Petrological, Mineralogical and Geo-Chronological Services Laboratory of the Bureau of Mines and Geo-Sciences, Ministry of Natural Resources (hereinafter referred to as "Petrolab"), and address of the proposed site is in the compound of BMG site, North Avenue, Diliman, Quezon City, Metro Manila, as per attached in Annex I.

2. The objective of the Project is to construct new building and install facilities as well as equipment for Petrolab in order to enhance the capabilities of the Bureau of Mines and Geo-Sciences in serving the Philippine mining industry in petrological, mineralogical and geo-chronological analysis and thus assume a center in this field in the Philippines.

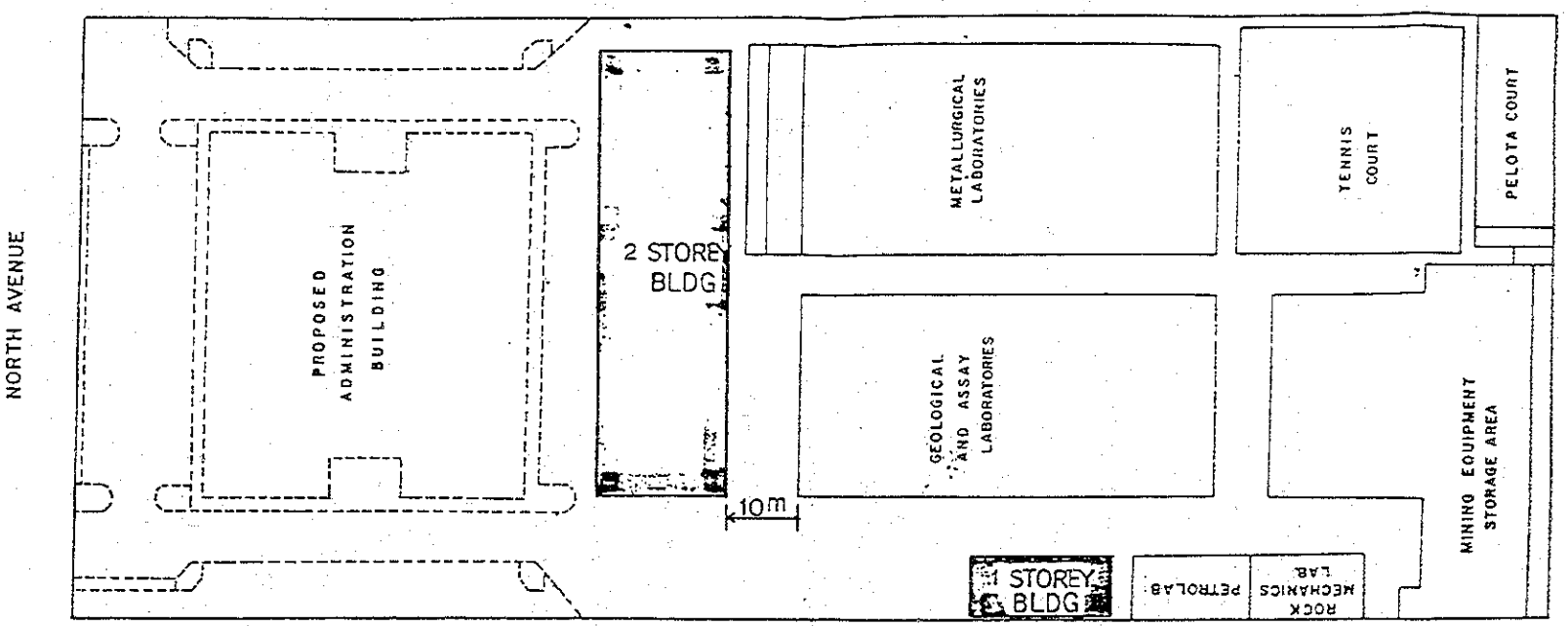
3. The principal composition and description of Petrolab is as given in Annex II.

4. Japanese Survey Team will convey the desire of the Philippine Authorities Concerned to the Government of Japan that the Government of Japan will take necessary measures to cooperate in implementing the project and provide the Government of the Philippines with building and other items as listed in Annex III within the scope of Japan's Economic Cooperation Programme in grant form.

5. Japanese Survey Team will complete the Basic Design Study Report on the Project.

6. Philippine Authorities Concerned have confirmed that the Philippine Government will take necessary measures such as those listed in Annex IV in the course of implementing the Project.

ANNEX I



PROJECT : PETROLOGICAL, MINERALOGICAL, & GEOCHRONOLOGICAL SERVICES LABRATORY (PETROLAB)
LOCATION : BMG SITE, NORTH AVE, DILIMAN, QUEZON CITY, METRO MANILA, PHILIPPINES

NO SCALE

N

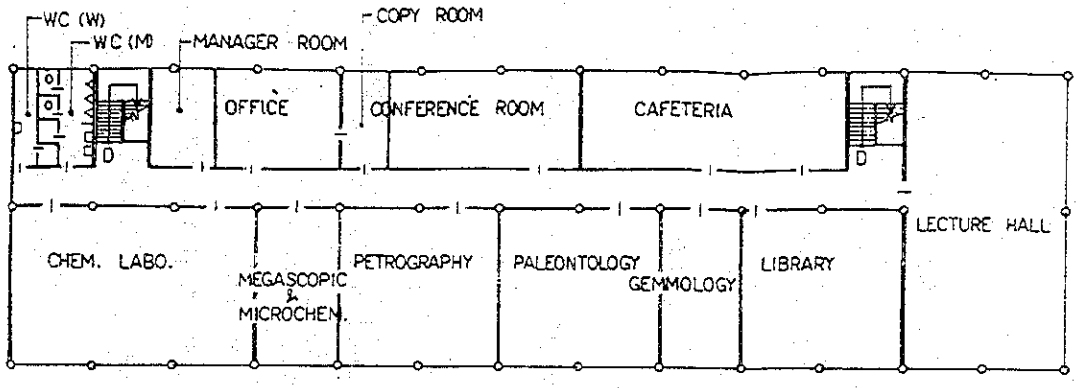
SITE PLAN

ANNEX II

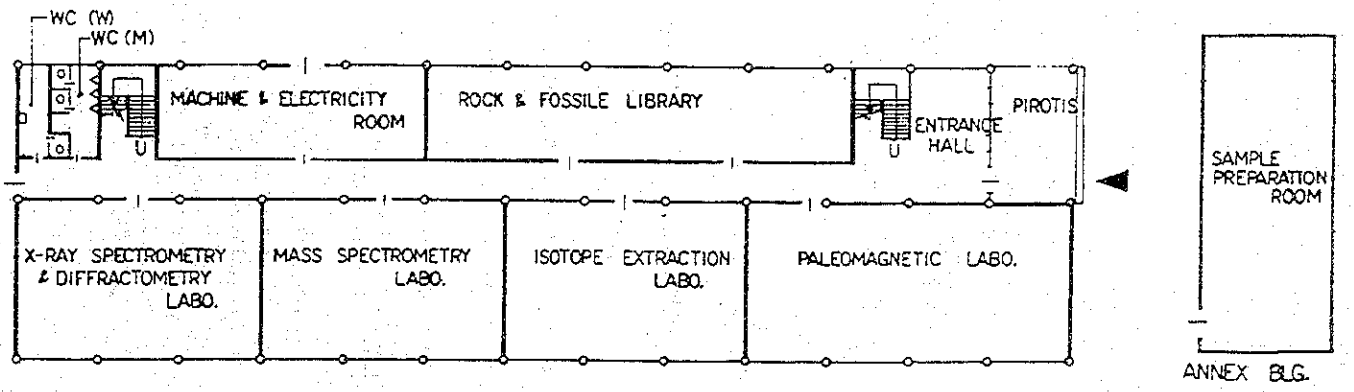
1. The Petrolab consists of the following:
   1) Sample preparation service unit
   2) Copy service unit
   3) Petrography-mineragraphy service unit
   4) Mineral analysis service unit
   5) X-Ray spectrometry and diffractometry service unit
   6) Gemological service unit
   7) Paleontological geochronology service unit
   8) Paleomagnetic geochronology service unit
   9) Rock and fossil standards library
   10) Book references library

2. The above enumeration from 1) to 10) will be contained in a two-storey building. A sample preparation service unit will be built separately in an independent one-storey building.

3. The Basic Design Report is to be completed based on the contents mentioned in 1. and 2. above and the concept plan attached herewith.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

NO SCALE

CONCEPT PLAN

Mar. 6, 1981

ANNEX III

1. Building

Two (2)-storey reinforced concrete building

One (1)-storey annex building

2.) Equipment

I T E M

1.) Gas chromatograph

2.) X-ray diffractometer

3.) X-ray flourescense analyser

4.) Set of equipment for paleomagnetic determination including spinner magnetometer, A-C demagnetizer, thermal demagnetizer; table type diamond drill and portable diamond drill

5.) Microhardness tester

6.) Sample crushing and grinding equipment

7.) Atomic absorption

8.) Automatic thin sectioning machine

9.) Platinum crucibles with cover

10.) Platinum dishes

11.) Standard glasswares for wet chemical laboratory

12.) Lot of standard chemical laboratory equipment including oven, hot plate, water bath and fume hood

13.) Digital analytical balance

14.) Copying machine

15.) Polaroid camera

16.) Nikon FE camera

17.) Overhead projector

18.) Slide projector

19.) Refrigerator freezer

20.) Dark-room equipment for photo-processing and printing

21.) Land cruiser jeep

22.) Diamond cutting machine

23.) Isodynamic magnetic separator

24.) Semi-precious stone preparation equipment including gemlab cabber, faceting machine, micro-caliper, diamond wire hand saw, etc.

25.) Electric typewriter with long carriage

26.) Passenger sedan

27.) Portable electric typewriter

28.) Pocket calculator

29.) Microscopic reflectance meter

REMARKS:

Besides the equipment mentioned above, the Philippine Authorities Concerned strongly requested the Japanese Survey Team to convey to the Government of Japan their desire that mass spectrometer (gas) and $C1_4$ analyzer will be included into the equipment purchased under the grant.

ANNEX IV

Following arrangements are required to be taken by the Government of the Philippines.

1. To secure a lot of land necessary for the construction of facilities and to clear the site.
2. To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities outside the site.
3. To ensure prompt unloading and customs clearance at ports of disembarkation in recipient country and prompt internal transportation thereof of the products purchased under the grant.
4. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in recipient country with respect to the supply of the products and the services under the verified contracts.
5. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into recipient country and stay therein for the performance of their work.
6. To maintain and use properly and effectively that the facilities constructed and equipment purchased under the grant.

7. To bear all the expenses, other than these to be borne by the grant, necessary for construction of the facilities as well as for the internal transportation of the products and services under the grant.

8. To undertake incidental civil works such as planting, roads within the site, gates, gate offices, parking lots and exterior lighting, if needed.

9. To furnish furnitures except those which are of laboratory use.

AGREED MINUTES OF THE SECOND DISCUSSIONS
ON THE CONSTRUCTION PROJECT OF PETROLOGICAL,
MINERALOGICAL AND GEO-CHRONOLOGICAL SERVICES LABORATORY
IN THE REPUBLIC OF THE PHILIPPINES

The Japanese study team on the captioned project, headed by Mr. M. ENOMOTO of Japan International Cooperation Agency, was dispatched to the Philippines from 11th to 16th May 1981, by the Government of Japan to discuss the draft report on the basic design for the construction of Petrological, Mineralogical and Geo-Chronological Services Laboratory in the Republic of the Philippines (hereinafter referred to as "the PETROLAB").

Having completed a series of meetings with Bureau of Mines and Geo-Sciences (hereinafter referred to as "BMG") headed by Mr. JUANITO C. FERNANDEZ, Director of the Bureau, both sides agreed on the following points:

1. Name of the Laboratory

   The name of the Laboratory was decided as "Petrological, Mineralogical and Geo-Chronological Services Laboratory".

2. The draft report on the construction of the PETROLAB was explained by the Japanese Team, and of which contents BMG side fully understood. BMG side also

confirmed its acceptance of the report in principle with amendments contained in the Appendix.

3. Laboratory equipment

The list of the Laboratory equipment stated in the report was examined and agreed upon by both sides.

Minor modifications, if necessary to finalize the equipment list, will be considered by the Japanese Team within the budget allocation for the construction of the PETROLAB under the Grant Aid Cooperation.

4. Maintenance of the PETROLAB

PETROLAB, after its completion of construction, shall be well maintained and necessary maintenance funds for Laboratory equipment, building and building facilities shall be allocated by the BMG.

May 14, 1981

MASAYOSHI ENOMOTO
Leader of the Japanese
Study Team

JUANITO C. FERNANDEZ
Director of the Bureau of Mines
and Geo-Sciences

APPENDIX

1) Additional Laboratory Equipment List

   a. Microhardness tester (included in the minutes of the first discussion)

   b. Binocular microscope (for paleontological analysis)

2) Building Plan

   a. In the ground floor plan (04), exchange position of rooms 102 and 103 with rooms 108 and 110, respectively.

   b. In ground floor plan (04), transfer room 109 into room 112.

   c. In ground floor plan (04), make a separate airconditioned room for fossil standards within room 114.

   d. In Sample Preparation Building (09), a shower and locker room will be added.

   e. In ground floor plan (04) and second floor plan (05), transfer lavatories to the position beside staircase A.