

BASIC DESIGN  
FOR  
THE CHEMICAL INDUSTRY TRAINING &  
DEVELOPMENT CENTER IN INDONESIA

JUNE 1980

JAPAN INTERNATIONAL COOPERATION AGENCY

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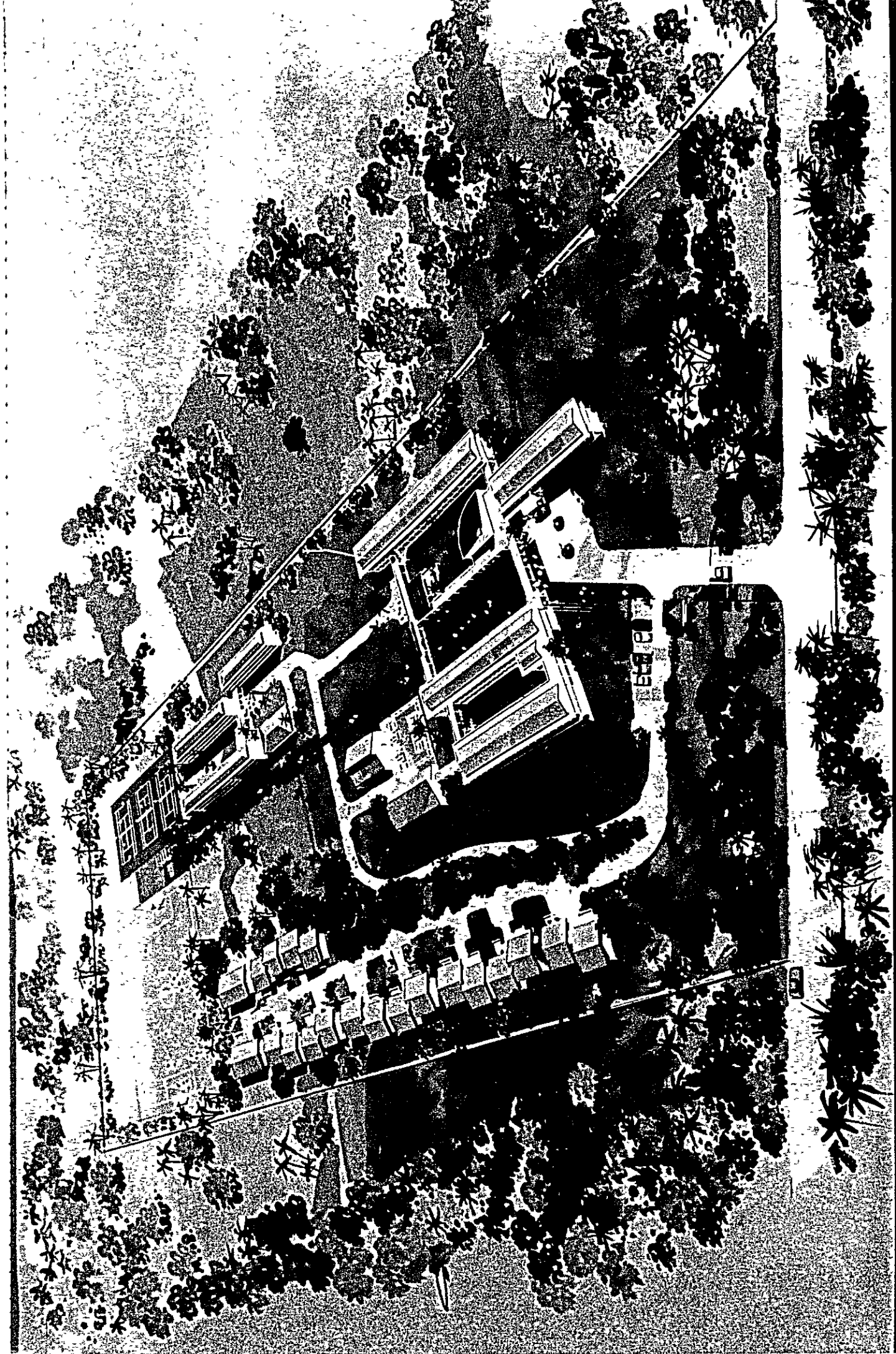
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国際協力事業団	
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KUME ARCHITECTS-ENGINEERS assigned by the Japan International Cooperation Agency, joined the basic design survey team under this project and took charge of compiling this report.



THE CHEMICAL INDUSTRY TRAINING AND DEVELOPMENT CENTER IN INDONESIA





## PREFACE

In response to the request of the Government of the Republic of Indonesia, the Japanese Government decided to conduct a survey on the Chemical Industry Training & Development Center Project and entrusted the survey to the Japan International Cooperation Agency.

The J.I.C.A. sent to the Republic of Indonesia a survey team headed by Dr. Hiroshi Tsuboi from March 24th to April 13th, 1980.

The team exchanged views with the officials concerned of the Government of the Republic of Indonesia and conducted a field survey in Medan area, North Sumatra.

After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation extended to the team.

July , 1980



Keisuke Arita

President

Japan International Cooperation Agency

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# OUTLINE OF THE PROJECT

## A. Purpose of the construction of the Center

This Center, coming under jurisdiction of the Education & Training Center of the Ministry of Industry of the Indonesian Government, is to provide training to Middle class engineers working for the country's chemical-related industries, contributing to the development of the regional industry in Sumatra, an increase in employment opportunity and stabilized living for the people. It is also aimed at developing appropriate technologies in the conditions of Sumatra region through promotion of optimum technologies and playing a leading role in developing the chemical-related industries through technical guidance and information service.

## B. Composition and function of this Center

This Center is composed of the following four divisions:

### 1) Training Affairs Division

1st stage: Training of technical instructors for trainee development

2nd stage: Training of engineers & technicians by instructors

3rd stage: Expanding the scale of trainee development as well as their quality improvement

### 2) Training & Development

Technical advisory will be given for development Division appropriate technologies in the local chemical industries, technical persons will be kept and technical levels will be maintained, thus making this Center even active. Priority will be given to and development will be done for high-grade research themes useful for developing related industries.

### 3) Technical Service Division

This division will play a vital role in developing the regional industries in Sumatra by providing technical advisory service and information to companies the basis of technology development.

### 4) General Administration Division

This Division will be responsible for General administration and management of this Center.

## C. The project site

The project site of the Center is located about 5 kilometers southeast of Medan center. Situated very close to future industrial zone planned by the Medan urban development, the projected area constitutes part of the zone which has a potential of the future development.

The site prepared for the Center is a flat area, mostly arranged, running about 400 meters from east to west and about 200 meters from north to south and occupying an area of 8 ha.

A 14-meter wide road runs along the western side of the site. The road will be expanded to future 20-meter wide. A Ring Road (48 meters wide) is planned at the western side and a Toll Road (100 meters wide) linking Berawan and Tanjung Morawa at the eastern side. Currently, the site is either a farm land or uncultivated area. As it is relatively lower than the nearby road, it is necessary banking soil (at the responsibility of the Indonesian side).

## D. Facilities

### · Buildings

- 1) Administration Building (approx. 630 M<sup>2</sup>)  
Chief room, office room, conference room and room for Japanese experts are included.
- 2) Training and Development Buildings (approx. 1,080 M<sup>2</sup>)  
Organic chemical laboratory, inorganic chemical laboratory, agro chemical laboratory, electronic microscope room, technical advisory room, information & Statistics room, library, conference room and office room are included.
- 3) Lecture hall (approx. 280 M<sup>2</sup>)  
It will be able to accommodate about 200 persons. Movable seats will be provided.
- 4) Training Affairs Buildings (approx. 2,230 M<sup>2</sup>)  
Class room, chemical analysis laboratory, industrial chemical laboratory, physical chemistry laboratory, drawing room, chemical machinery laboratory, material testing laboratory, studio and office rooms are included.
- 5) Workshop (approx. 250 M<sup>2</sup>)  
Practical plant, control room for miniature plan are included.
- 6) Student Canteen (approx. 70 M<sup>2</sup>)
- 7) Gatehouse (approx. 20 M<sup>2</sup>)
- 8) Utilities (approx. 140 M<sup>2</sup>)
- 9) Covered way (approx. 550 M<sup>2</sup>)
- 10) Dormitory (at the cost of Indonesian side)  
A dormitory will be able to accommodate about 150 students. A dining hall will be provided.

### · Related facilities

- 1) Water supply facilities
- 2) Drainage facilities
- 3) Septic tanks
- 4) Electricity receiving facilities (450 KVA)
- 5) Electricity supply after electricity receiving facilities

- 6) Emergency generators (100 KVA)
- 7) Frontal gate and fence
- 8) Premise roads
- 9) Outdoor lightings
- Related equipment
  - 1) Analysis equipment
  - 2) Chemical industry equipment
  - 3) Measuring equipment
  - 4) Drawing equipment
  - 5) Metal processing equipment
  - 6) Ordinary experimental equipment
  - 7) Low-temperature experimental equipment
  - 8) Automatic control experimental equipment
  - 9) Practical equipment

## E. Facilities layout

The basic policy concerning facilities layout is to provide as much green area as possible in and around the site for the Center in order to keep its favorable circumstances when development of the nearby area and roads running the eastern and western sides of the site are completed.

As for facilities layout, Administration building will be first determined in relation to a main approach, then Training & development building, Training affairs building and a Lecture hall will be determined. A central plaza will be provided in the center of each building for linking one building to another, making it functional for students' association.

A student canteen will be plotted at one corner of the plaza. Then, a Workshop and Miniature plant as well as utilities will be arranged as an extension of the Training affairs buildings.

These buildings will be a source of noise and vibration so that layout should be done without deteriorating the circumstance as a whole. Dormitory and sports facilities will be provided in an extension of the central plaza. The staff houses will be provided at a distance apart from an axis of these buildings with independent circumstances.

Flow diagram shall be made to clearly separate a pedestrian flow from that of vehicles. Service of vehicles within the site should be done entirely from the outer service road in connection to each building. Pedestrians will have use safe exclusive road. Each building shall be connected by covered-way to avoid rainfall and solar radiation effect.

The axis of buildings should run from east to west in consideration of local weather conditions, wind and sunshine.

## **F. Costs assigned by the Indonesian side**

The costs assigned by the Indonesian side in carrying out construction of this Center will be as follows:

- 1) Acquisition of land, land survey, soil boring, banking and leveling of the land
- 2) Electricity supply as 380V
- 3) Drill deep well
- 4) One main telephone line
- 5) Fence work (excluding frontal part)
- 6) Lawn & planting
- 7) Staff Housing
- 8) Dormitory

## **G. Construction materials**

Construction materials produced in Indonesia should be used as much as possible in the finishing schedule.

# 1. BACKGROUND AND CIRCUMSTANCES OF THE PROJECT

## 1-1 BACKGROUND OF THE PROJECT

In the official dispatch No. 1990 dated 2nd October 1978, the Japanese Ambassador to Indonesia reported to the Foreign Minister of Japan a draft plan regarding "Establishment of the Chemical Industry Training & Development Center in North Sumatra". Also, in the dispatch of 24th January 1979, a request was made to the Government of Japan to request cooperation to the project in detail for establishing the Center. Also, in the dispatch No. 710 dated 30th March 1979, a request on Japanese technical cooperation relating to this Center was extended.

In the official dispatch No. 1871 dated 9th August 1979, the Indonesian Government requested Japanese Government to send experts to that country at least for about five years until the Indonesians become able to manage this Center on their own, and train Indonesian counterpart in Japan for the eventual technology transfer.

The Educational Training Center of the Ministry of Industry, counterpart of the Indonesian Government, has requested that a chemical industry training and development center be established in Medan, North Sumatra for the middle-class engineers who will comprise the technical/ senior highschool graduates to train for one or two years for the purpose of obtain the needed knowledge to become educated workers or to be able to run in chemical plants in North Sumatra.

In response to the request, the Japan International Cooperation Agency decided to dispatch a Preliminary Survey Team for confirming the Indonesian requirement and carrying out necessary surveys, including local conditions, and conducted the surveys in September 1979. Based on the findings of the Preliminary surveys (preferably the project being pushed under a combined method of economical and technical cooperation), JICA, with the aim of conducting the necessary surveys for the basic design regarding construction of this Center, determined to dispatch a Basic Survey Team to conduct the surveys in three weeks from 24th March 1980.



## 1-2 NEED OF THE PROJECT

Under its Third five-year Development Plan (1979 through 1983), Indonesia puts the goal of achieving the high 11 per cent annual industrial growth in order to attain an average 6.5 per cent economic growth yearly. Among other things, the country places emphasis, in the industrial sector, on the chemical industry having a base on the rich, regional natural resources to go through with the growth target and sets such four departments for expanding the industrial sector greatly. (See Table 1)

Organic chemical .....	LNG, Olefin, aromatic, methanol
Inorganic chemical .....	fertilizer, aluminum, carbon black, cement, sheet glass
Agro chemistry .....	palm oil, agricultural chemicals
Cellulose and rubber .....	pulp, paper, rubber

As clear from the above, the chemical industry occupies an important position in the Third five-year Program. In addition, the four departments mentioned above are mostly to be seen in Sumatra, like those associated with the Asahan project and several other projects carried out by the Association of Southeast Asian Nations (ASEAN). Sumatra abounds in oil and natural gas. Aside from the Arun natural gas in Aceh State and oil in the middle and southern parts of North Sumatra, Sumatra has rich natural resources of palm oil and natural rubber. Owing to these abundant natural resources, Sumatra appears likely to show a rapid industrial development in the future.

Along with the basic chemical industry, development of smaller businesses is also important in industrial expansion. Developing the smaller enterprises, however, is much problematic in Indonesia. On this account, the Indonesian Government plans to develop smaller businesses in Sumatra for providing more employment and promoting diversification of population, thereby stabilizing people's living.

For developing the chemical industry as a main pillar for achieving the goal set under the Third five-year Plan, following is being pointed out:

- 1) Shortage of skilled workders, among other things middle-class technicians and engineers.
- 2) Lack of institutions or the Center that assume a key role in developing smaller chemical businesses and establishments of technical guidelines and information service.

Under these circumstances, the concept of establishing this Center plays an important role and contributes to promotion of the chemical industry. Accordingly, the Ministry of Industry of the Indonesian Government, is much enthusiastic about setting up this Center. In particular, the Ministry is calling for establishment of this Center as no similar center now exists in Sumatra and the plan to establish such a center is the first of its kind in Indonesia.

Table 2 shows a relation of Japan's cooperation with the operation period of Sumatra's chemical-related industries. The plants of Indonesian chemical companies are due to start up in 1982-84 and the first graduates of the three-year Academy School of this Center will find job in 1985. During this period, a short training course will be provided simultaneously with the opening of the Center in 1982. In this connection, it is urgently desired to extend Japanese cooperation early as possible.

## 1-3 BASIC CONCEPT AND FUNCTION OF THE PROJECT

### A. Basic design of this center

#### (1) Fundamental conditions for establishing this Center

- 1) To play a leading role for development of the chemical related industries with the aim of promoting regional industrial development of Sumatra,
- 2) To train engineers and technicians for the three major projects (Asahan aluminum smelting and development project, Ache urea project and Alun LNG project), and
- 3) To have this Center an affiliated organization for education, technical development and technical guidance under the Ministry of Industry.

#### (2) Objective of establishing the Center

- 1) To train engineers and technicians for development of the regional industries increasing job opportunities and stabilizing people living in Sumatra.
- 2) To develop appropriate technologies in Sumatra through technical development,
- 3) To play a central role for the regional industries through technical guidance and information service, and
- 4) To facilitate advance of corporations and their plant construction in the field of personnel and technology.

#### (3) Function of the Center

##### 1) Personnel development

Training will be given to develop leaders in the first stage, and the leaders will give training to engineers and technicians in the second stage and the scale of personnel development will be expanded in the third stage.

##### 2) Technical development

Training will be given for improving technologies suited for the regional industries by having people fix themselves and maintaining technical levels for turning this Center much vivid. Themes for research aimed at developing the related industries will be selected and put into practice.

##### 3) Technical advisory and information service

Technical advisory and promotion as well as information service will be provided to local industries on the basis of the results of the technical development to have this Center play a key role in the chemical industries in Sumatra.

### B. Composition and function of the Center

Chart 1 show the position of the Center. Among the Academy Schools belonging to the Education & training center which is under a direct control of the Ministry of Industry of the Indonesian Government (Director General: Ir. SOEBROTO), this Center will be ranked 6th (in Medan City). Unlike other organizations, this Center will have not only an educational function but such functions as technical development, technical advisory and information service in consideration of the special factors in Sumatra.

Table 3 shows the organizational setup of this Center and its business scope. The Training and Development Division will be directly responsible for educating trainees for short-training course as well as students of Academy schools.

In other words, teaching staff belong to the Training and Development Division and study technical development and compile curriculums.

The Training Affairs Division will take charge of controlling trainees (short-training course), administrating educational facilities and practices and helping students find employment.

The Technical Service Division will be in charge of promotion of the results obtained by the Training and Development Division, information control and service, technical consultation, technical guidance and itinerant technical guidance.

The Administration Division will be responsible for general clerical works and administration for this Center and working-level contacts with outside.

PERSONNEL DEVELOPMENT: It will be done by the Training and Development Divisions. Their functions are shown in Table 1 in consideration of the request of the Ministry of Industry of the Indonesian Government as well as Indonesian corporations and the surveys of this Basic Survey team. Middle-class technicians and engineers engaged in operating, maintenance and technologies at plants will be given training concerning the four sectors of the chemical industry (organic, inorganic, agro chemicals and cellulose & rubber). Trainees will be those from Academy schools under jurisdiction of the Ministry of Industry.

The qualifications for admission to this Center will be those graduating from senior junior high schools. They will be trained for three years. As shown in Table 4, the objective of training and curriculums are designed to make the intra-company training fully understandable even after students find employment and training will be done for making them have the basic common knowledge regarding each of the four chemical related industries. On this account, the first-year students will be given general basic education, the second-year students will be offered special, basic education and practices (analysis and practical measuring), and the third-year students will be required to select a special course (either chemical technology or chemical machinery). They will be provided chiefly class-room and field studies. Among the graduates from the special course, those selecting the chemical technology course will be responsible mainly for operation of plants and those selecting the chemical machinery course will take charge of maintenance. Aside from the three-year Academy School course, a short-training course will be provided to meet the strong requests from businesses for re-educating those once finding employment. To achieve this, the content of training and facilities should be studied with a particular caution. For instance, it is preferable that training will be conducted with an emphasis on 1) theory and operation using a miniature plant, 2) theory and handling of measuring instrument and 3) practical training using measuring instruments. Of course, effective facilities will be required for carrying out such training. A period of training will be one to two months with a single training needing about 15 persons (a maximum of 20 persons). Training will be given to 150 to 200 persons yearly.

When the short-training course is fixed, the Center will be able to accept trainees from Indonesia's nearby countries and other nations in accordance with the Indonesian plan. The third-country training which Japan has in mind also will be possible.

As for acceptance of trainees in Japan, four persons will be accepted each year for a period of four years after the cooperation extension gets under way, bringing the number of trainees to 16 in four years. They will be given an intensive training at a suitable training center in Japan for one year. When it comes to training by experts, the 6-7 experts will offer training on technology development to leaders on a long-term basis while the technical cooperation period is effective. Full guidance will be required for administration and management of this Center in order to make the Indonesians cope

with by themselves after the cooperation period. When the Academy Schools are opened, each class will comprise 25 students with the aim of developing talented persons through a thoroughgoing training of a relatively smaller number of trainees. Accordingly, the number of students will be increased gradually three years after opening in consideration of the system, facilities, the number of trainers and how students will find employment. Eventually, the total number of students comprising the first and second-year course students, will go up to about 150. All students will be required to live in dormitories.

TECHNICAL DEVELOPMENT: The Training and Development Division for the moment will put an emphasis on education of students and trainees. It will provide guidance a developing method during a cooperation period, thereby achieving a result relative to technical development. Theems to be adopted will be four chemical processing industries. For instance, appropriate technologies leading to more employment will be developped or the existing technologies will be improved into those suitable for the local conditions, utilizing local resources, in relation to plastic molding technologies, palm-oil refining technologies, rubber molding and processing technologies, technologies for turning tropical-plant fabrics into pulps, technologies of spinning synthetic fibers and technologies of using bio-mass. In particular, an emphasis will be placed on development of smaller chemical-related industries. The researchers of this field will also assume a post of teacher at the Academy Schools. They will have to strive to improve the quality of the educational program in order to make this Center more active. In addition to the education equipment, measuring instruments will be required for technology development and test utilization involving the four chemical fields.

TECHNICAL ADVISORY AND INFORMATION SERVICE: Promotion of technologies piled up through technical development, information service, technical news publication, technical consultation and itinerant technical guidance will be necessary for developing smaller industries.

This Center is expectec to play a central role in the chemical related industries in Sumatra when the above-mentioned three divisions function well. Although the Ministry of Industry of the Indonesian Government will be responsible for administration and management of this Center, adequate considerations will be required because this Center is a multi-purpose center for education, technical development, technical advisory and information service. Moreover, it should be so designed as to enable the Indonesians to keep the management on their own after the Technical cooperation period.

As part of steps for making bugdetary appropriation and securing financial sources, the fee for short-training course will be charged, and educational facilities will be amortised or renewed. Facilities of this Center will be opened to private companies to make much utilization of them. At the same time, systems for joint research with them, consignment test and research will be established. Also, systems for providing technical consultations and guidance will be established to contribute to private companies and build up a rational management structure of this Center.

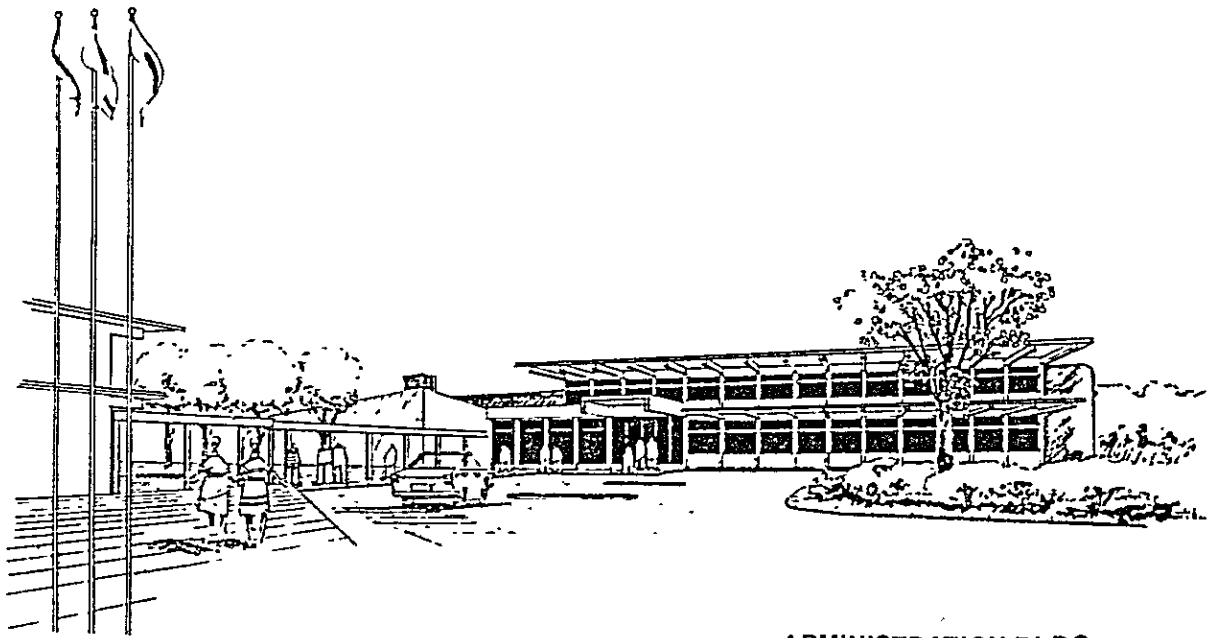
Teachers will be invited form the Bandung University of Technology since Medan is far from Java Island, so that it is difficult to find excellent teaching staff. Quality of teachers will be improved by holding seminars when necessary. As this Center is located close to the North Sumatra University in Medan City, close relations will be maintained through interchanges of personnel, opening of facilities of this Center to the university and joint research activities.

# 1-4 ESTABLISHING AND OPERATION SCHEDULE

Establishing and operation schedule is as following.

TENTATIVE MASTER SCHEDULE OF JAPAN COOPERATION

Items	Annual	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year
	First Year	1979	1980	1981	1982	1983	1984	1985	1986
<b>I. TECHNICAL COOPERATION</b>									
1. DISPATCH OF SURVEY TEAM	□ PRELIMINARY SURVEY TEAM			□ IMPLEMENTATION SURVEY TEAM	□ CONSULTATION TEAM		□ TECHNICAL GUIDANCE TEAM	□ EVALUATION TEAM	
2. ASSIGNMENT OF JAPANESE EXPERTS				← (A/D TEAM 5 years) →					
3. COUNTERPART TRAINING IN JAPAN				SHORT-TEAM EXPERTS (TRAINING PLAN & EQUIPMENT INSTALLATION)					
4. EQUIPMENT FURNISHING				LONG-TEAM EXPERTS (INSTRUCTOR & TECHNICAL INSTRUCTION)					
				TRAINING OF TEACHING STAFF & INSTRUCTORS FOR TECHNICAL DEVELOPMENT					
				FURNISHING OF PRINCIPAL EQUIPMENT					
				FURNISHING OF FOLLOW UP EQUIPMENT					
				OPERATION START OF THE CENTER					
<b>II. ECONOMIC COOPERATION</b>									
1. DISPATCH OF SURVEY TEAM	□ BASIC SURVEY		◆ EXCHANGE OF NOTE						
2. BUILDING CONSTRUCTION			CONSTRUCTION						
3. PROVISION OF EQUIPMENT			SPECIFICATION ETC. INSTALLATION						



ADMINISTRATION BLDG.

## 1-5 EVALUATION ON SURVEY FINDINGS

As the results of the Preliminary survey and Basic survey, the Survey team has fully confirmed the urgent necessity of the establishment of the Sumatra Chemical Industry Training & Development Center which completes to develop appropriate technologies in chemical industry, to train and brush up middle class engineers and to play in conducting technical advice and information services for the regional chemical industries concerned which will serve to stimulate the development of the related chemical industries in North Sumatra as well as the Industrial growth of Indonesia. Therefore, the Center function is planned to play a leading role for the development of the Chemical Industries.

Medan is a central city in North Sumatra province which has a significant potenary of industries growth, and also the administrative center of the Sumatra province. Furthermore, Medan is situated in the center of the development area of chemical industry projects, such as Asahan, Arun and Ache projects. Therefore, the location of the Center which is located in the Medan Center proposed by Indonesian side is significant and effective for the Japanese technical and economical cooperation project.

Architectural planning of the Center such as facility volume, facility function and training equipment are on the basis of the series of discussions, during Preliminary and Basic Survey period, among staff members of the Educational & Training Center of Ministry of Industry (Pusat Pendidikan & Latihan Pedawai), authorized counterpart of Indonesian Government.

As the results of investigation and survey of building conditions and related facilities in Indonesia, the Survey team has confirmed that appropriate leveling of the facility grade is planned to cope with the Indonesian technical training situations, maintenance capability and their technical levels, and also in consideration of economical efficiency, architectural & construction planning is simplified and planned to adopt local construction method and materials as much as considerable.

Basic planning of facilities are fully described in the following Chapter.

## 2. PLANNING OF FACILITIES

### 2-1 BASIC POLICY

This Center is planned to include Training Affairs building for educating 150 trainees, Training & Development Building for research and development, information service and technical consultation, Administration building, other facilities such as Student Dormitory and Staff Houses.

The area of the projected construction site is located about 5 km from Medan and is in the middle of a pastoral area. It is located on a tract of about 400m long from east to west and 200m from north to south.

Consideration should be given to the following points to set up the basic design:

- 1) Intensive and functional use of each facility,
- 2) Harmony with the circumstances surrounding,
- 3) Construction to be pushed with positive use of raw materials produced in Indonesia as well as methods suited for the local conditions,
- 4) Minimizing construction cost as well as operating cost

The intensive and functional development of each facility will allow to reduce construction cost as well as to make administration and management easier by minimizing circulation and utility flow.

To plan the intensive development of the facilities, it is carefully considered that the pedestrian circulation and the flows of the service vehicles must not be intermingled with each other.



## 2-2 SITE PLANNING

### 1) Outlines of the project site

- The project site is located about 3 Km from the Medan-Siantar national road and along its western side the Medan Ring Road (48m wide) is planned to be constructed and along its eastern side Toll Road (100m wide highway) is also planned.
- Most of the surrounding areas are paddy fields with private local residences sporadically standing along the JL Medan-Tenggara front road. Because the site is about 2 meter lower than the facing road, it is necessary to provide embankment to avoid a flood in case of heavy rainfall.
- Wind direction is the north-northeast and south-southwest.
- Existing trees in the site should be used on the building layout as much as possible.

### 2) Weather condition

- In Medan, the average temperature is 26.5°C and the average humidity is 78%. No remarkable changes will occur throughout a year in temperature and humidity. A rainy season is from September through January during which a short but heavy rainfall is recorded every day.
- Since the area is right on the equator, a solar radiation is strong with a maximum temperature of about 32°C. Buildings which have no air-conditioning facilities should be provided with a complete ventilation because of high humidity.

### 3) Characters of each building

- Administration Building  
The main functions are clerical works and conference. Although an emphasis is put on an ordinary living aspect, the Building should play a front of the Center.
- Training Affairs Building  
The Building is for Lectures and comprise class rooms and laboratories.
- Training & Development Building  
The building is for information service and have an auditorium and library.
- Student Dormitory  
This is for trainees. Along with rooms, a dormitory canteen is provided.
- Staff Houses  
About 20 residential houses will be constructed for local staff.

### 4) Zoning plan and facility layout

Facilities which this Center will comprise can be divided largely into the following four (4) zones in accordance with their functions.

- (1) Administration zone  
Administration Building
- (2) Training zone  
Training Affairs Building, Training & Development Building, Workshop, Canteen and Lecture hall
- (3) Dormitory Zone  
Dormitory and Dormitory Canteen
- (4) Staff Housing zone  
Staff Houses

As mentioned above, each building has a different character.

In building layout, Administration Building should be first decided in relation to a main approach and then, Training Affairs Building, and Training & Development Building are to be determined along an axis in the central site from the main approach and the space between these two Training buildings will be used as a central plaza.

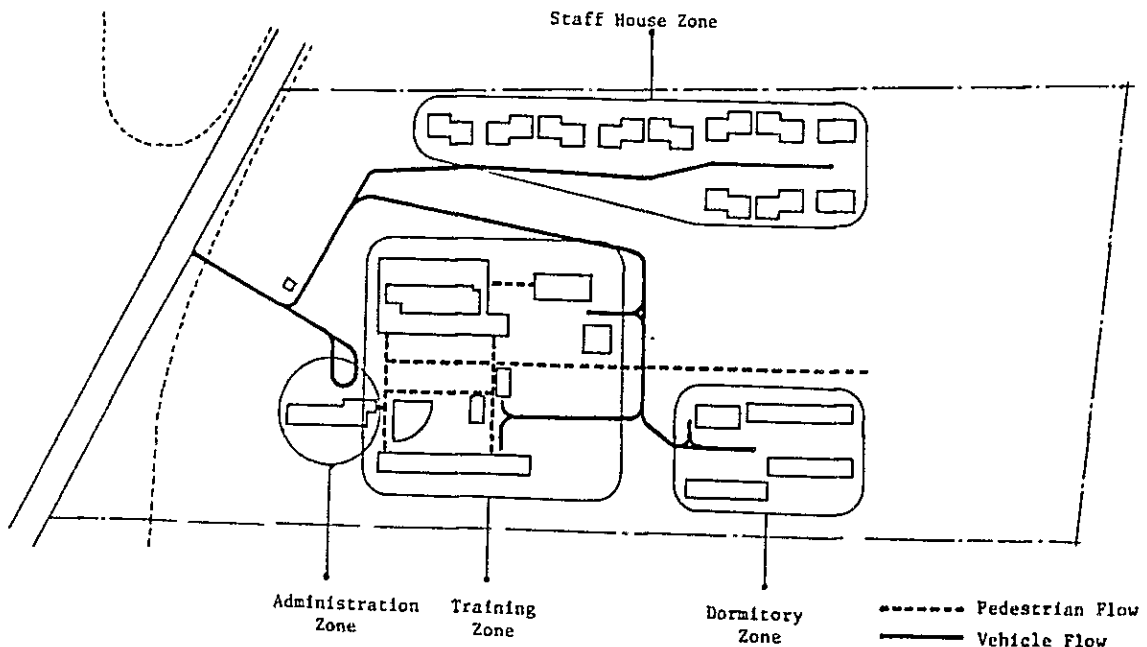
A dormitory zone will be provided at an area far advanced from the axis in order to have students recognize their life in dormitory as an extension of their training. Since some families without a contact with training may live in the zone for residential houses for staffers, this zone should be somewhat apart from this axis. Sports facilities are to be built in the east side of the site in consideration of vibration and noise when a highway road is completed. Planting will be made adequate in and around the sports facilities to improve the nearby circumstances, thus making these facilities as a buffer zone against vibration and noise.

5) Linkage diagram

A linkage diagram should be worked out for clearly separating pedestrian flow and that for vehicles. Service of vehicles within the site should be done entirely from the outer service road and pedestrians should use the safe exclusive road which includes a central plaza.

The exclusive road for pedestrians among buildings should be connected corridors as covered way to minimize an impact of rainfall and solar radiation.

ZONING PLAN & LINKAGE DIAGRAM



## 2-3 FACILITY PLANNING

### 1) Administration building

The Administration building will be 2-story, reinforced concrete structure. The ground floor will be composed of general administration and office rooms, reception room and room for the chief of the center. The first floor will be composed of conference room and rooms for Japanese experts. The building is an entrance of this Center and function as administrating the Center in general.

### 2) Training affairs building

Two-story, reinforced concrete structure

Office room for Training division

Class rooms ..... six 25-trainee rooms, one 50-trainee room and one short training room

Laboratory ..... chemical machinery laboratory, material testing laboratory, chemical analysis laboratory, industrial chemical laboratory, physical chemistry laboratory

Drawing room

Studio

### 3) Training & development building

Two-story, reinforced concrete structure

Technical advisory room

Information & statistics room

Research & development office

Library and library office

Conference room

Laboratory ..... organic chemical laboratory, in organic chemical laboratory, agro chemical laboratory

Staff laboratory A,B,C

### 4) Student's canteen & staff's canteen

### 5) Workshop

6) Lecture Hall ..... capacity of accepting 200 persons

### 7) Gatehouse

### 8) Auxiliary facilities building

Mechanical room

Garage

Anteroom for employees

## 2-4 ELEMENT PLANNING

Local meteorological conditions are the important factors in designing building elements. In this hot and humid region, solar radiation, rainfall, and ventilation requirements will be important on building design, and suitable measures must be taken against these factors.

### 1) Roof

Roofs are the element most affected by solar radiation. Adequate heat insulating layers must be provided between the roofs and the interiors to assure water-proofing against heavy rainfall and to protect the interior from the radiation heat.

### 2) Exterior wall

Exterior walls are also affected by solar radiation. Eaves and louvers must be provided to minimize its effect.

Making the best use of the natural benefit of local winds, openings as large as possible will be provided in buildings to facilitate natural ventilation.

### 3) Floor level

The floor level should be sufficiently high to avoid flooding during the rainy season.

## 2-5 MATERIAL PLANNING

Considering the easiness of maintenance and construction costs, locally available materials should be used so long as there is no problem of availability.

### A. Structural materials

Structure is mainly reinforced concrete framework with concrete block wall. The roof frame will be of steel framework, in principle.

### B. Exterior finish materials

- 1) Roof ..... Long pitch corrugated asbestos cement slate
- 2) External wall ..... Mortar oil paint finish
- 3) Fitting ..... Wood

### C. Interior finish material

- 1) Floor
  - (a) General office, class rooms, conference room  
..... Vinyl asbestos tile sheet
  - (b) Corridor, lobby, etc. .... polished terrazzo
  - (c) Laboratory ..... polished terrazzo
- 2) Wall ..... Paint finish on mortar
- 3) Ceiling ..... Acoustic panel, plywood  
with oil paint finish

## 2-6 STRUCTURAL PLANNING

### A. Basic concept

Indonesia has its own Structural Code (Peraturan Muatan Indonesia, 1970) by which practices all construction of the building and structures are regulated. The design of the Center will be proceeded in accordance with this Structural Code taking into consideration of Japanese standards.

As for wind, annual mean wind velocity in Indonesia is about 1.6m/sec. and the maximum instantaneous wind velocity is about 14.0m/sec. and therefore, the effects of the wind can be negligible.

As for earthquake, although frequent earthquake have been recorded in Sumatra Islands in the Indian Sea, the area facing Maracca Strait scarcely recorded. Structure of the center building is of column and beam framed reinforced concrete construction and that for work shop is of steel framed construction. Expansion joints will be provided at an appropriate intervals to prevent uneven settlement of building and formation of cracks due to concrete shrinkage.

Although the ground of the projected site is fairly compacted, the level is lower than the road level running in front of the site, and the filling will be necessitated. Consequently, concrete or pile foundation shall be employed to bear the existing rounq.

### B. Structural design

The following external loads acting on the building shall be taken into consideration when analyzing the structure.

#### 1) Dead load

Calculate the dead load of materials which will be incorporated into the building as the structural members, finishing materials etc.

#### 2) Live load

Use the values shown in the Indonesian Structural Code in general, and for special rooms, calculate the values suitable to the actual conditions. The live loads for major rooms are as follows;

Room	Live Loads ( Kg/m <sup>2</sup> )
Class room, office, laboratory	250
Auditorium	500
Stairways, corridors	300
Store room, library	250

#### 3) Wind load

Since the height of the projected center does not exceed 20m, it is considered the wind pressure maximum 25Kg/m<sup>2</sup> for the main structural members of the building so long as conforming to the Indonesian Structural Code.

#### 4) Seismic force

Although the earthquake has been scarcely recorded in the city Medan, the seismic force of 0.05 will be considered in accordance with the Indonesian Structural Code.

### C. Structural materials

The structural materials are generally determined according to the scale, structure type and usage of the building and quality and quantities of materials local availability, construction method, transportation means and their costs, the materials shown below are deemed most suitable.

#### 1) Concrete

Portland cement, fine and coarse aggregates are all locally available. The batcher plant shall be provided at the site to weigh and mix the concrete. Use plain concrete with the strength of F28 210Kg/cm<sup>2</sup>. The ambient temperature at the site is supposed to be extremely high, dry mixed concrete shall be poured to prevent cracks due to quick hardening, and frequent curing by spraying water shall be performed after concrete has been placed.

#### 2) Reinforcing bar

Use chiefly deformed bars of SD-30 considering the local production capacity. Sizes of reinforcing bars manufactured in Indonesia are D 10 - D 25 with 6mm $\phi$  - 25mm $\phi$ .

#### 3) Structural steel

Though small sized angle steels equivalent to SS41 have been manufactured in Indonesia, they are not sufficient in quantity and mostly being depended on the imports. Use steel of SS 41 manufactured in Japan except those manufactured in Indonesia.

## 2-7 PLUMBING SYSTEM

### 1) Water supply system

Pumped up from a deep well (approx. 150m) within the site to the water reserver tank via an submerged pump, waters will be supplied to the place necessary for the individual facilities through an automatic pressure pump. Drilling the well and installing the underwater pump will be undertaken at the cost of the Indonesian side.

For instance, the well measures 120 inches in inner diameter, 150 meters deep and can pump up  $145\text{m}^3$  a day, and the underwater pump is 40 inches x 100 t/min. x 100m x 3.7KW.

### 2) Drainage system

The drainage system can be divided into water discharged from ordinary households are submerged after being treated by septic tank and water discharged from laboratories is processed in a neutralization tank and flown outside together with the rain water.

### 3) Sanitary fixture

Sanitary fixtures in lavatories and shower rooms should be in accordance with the construction plan. In particular, sanitary fixtures of local style will be provided for the student's lavatories.

### 4) Septic tank

Septic tank will be separately provided at the necessary area of each facilities.

### 5) Gas supply

Gas will be used as LPG and a bomb will be provided at the diverse area of each facility when necessary.



## 2-8 AIR-CONDITIONING AND VENTILATION SYSTEM

Considering maintenance and running costs, the rooms air-conditioned will be limited to electronic microscope room, material test laboratory, room of the chief of this Center and studio so as to use natural ventilation as much as possible.

### 1) Design conditions

- (1) Outdoor conditions ..... Temperature 31.4°C  
Humidity 80%
- (2) Indoor conditions
  - Electronic microscope room ..... Temperature  $20-25^{\circ} \pm 2^{\circ}\text{C}$   
Humidity  $60\% \pm 5\%$
  - Raw material test laboratory .....  $25 \pm 2^{\circ}\text{C}$

### 2) Air-conditioning system

Air-conditioning system will be provided to electronic microscope room, studio, material test laboratory and the areas requiring air-conditioning for maintaining the accuracy of test and for protecting equipment. No such system will be provided for human being directly.

### 3) Ventilation system

Although a stress will be given to natural ventilation, mechanically forced ventilation will be provided to the areas where natural ventilation is difficult due to the construction plan and need ventilation.

## 2-9 ELECTRICAL SYSTEM

### 1) Power supply system

High voltage supply power (20KV, 50Hz) received by the transformer is reduced to 380/220V and distributed to power facilities and illumination loads. (Works to be undertaken by the Indonesian side)  
A maximum permissible capacity will be approximately 450KVA.

### 2) Power generation facility

A diesel engine power generator will be installed in case of a failure of power supplied by power companies. The capacity of the generator will be about 50KVA.

### 3) Power circuit system

The electric main line systems are as following:

- (1) General lighting, receptacles ..... Single phase, 2-wire, 220V
- (2) Trunk lines for general lighting ..... 3-phase, 4-wire, 380/220V
- (3) Power source for fan and pump ..... 3-phase, 3-wire, 380V

### 4) Lighting equipment

Considering the running cost, fluorescent lamps will be mainly used as lighting equipment. Incandescent lamps will be used for the areas which require special designs from the viewpoint of construction. The intensity of illumination is as follows:

- (1) Office room, class rooms, laboratories  
..... 350 - 400Lx
- (2) Workshop ..... 300 - 350Lx
- (3) Hall ..... 150 - 200Lx
- (4) Corridors, lavatories ..... 50 - 100Lx

Receptacles will be installed in accordance with arrangement of laboratories and equipment to be used as well as its capacity.

Earthing will be carried out for the equipment needing a special grounding.

### 5) Telephone system

A service line will be installed from a trunk line. A compact, push-button type telephone exchange with a capacity of about 20 extension lines will be installed.

### 6) Interphone system

Interphone will be installed at rooms for mutual communication which will require close and high-frequency contacts for operational and practical reasons. An interphone for maintenance of electric systems and equipment also will be installed.

### 7) Fire alarm system

Manually operated alarm bells and emergency bell will be provided to cope with an emergency, such as fire.

### 8) TV antenna

A TV outlet will be provided to the studio at the 1st floor of Training Affairs Building and an antenna will be installed to receive TV program broadcast.

### 9) Lightning arrester

Lightning arresters will be equipped for preventing building facilities from being affected by lightning.

### 10) Outdoor lighting

Outdoor lighting will be equipped for night-time security. Using mercury lamps, the lighting can be turned on and off automatically by a timer.

## 2-10 EQUIPMENT PLANNING

In order to effectively achieve the educational training target at this Center, it is important to let students obtain the basic knowledge necessary for the chemical industry while providing them an interesting educational program. On the other hand, in order for this Center to become useful in technical development of the chemical industry, it is necessary to fully understand the actual situation (local availability of raw materials, supply of products and technical level) and offer technical assistance accordingly. Equipment installed at this Center is a key to successful education and technical development. Education and development will be done on the basis of such a viewpoint.

1) Chemical analysis laboratory

Educational equipment for learning basic analytical chemistry to understand the chemistry and chemical industry.

2) Industrial chemical laboratory

Educational equipment for learning basic organic and inorganic chemical industry.

3) Physical chemistry laboratory

Educational equipment for learning the physical chemistry as a basic theory of chemical industry.

4) Chemical machinery laboratory

Educational equipment for obtaining basic knowledge and fundamental practice on the chemical industry required for operation and maintenance of chemical plants.

5) Workshop

Education equipment for learning the basic repairing technologies of equipment, among other things chemical machinery, to be done at chemical plants.

6) Material testing laboratory

Educational equipment for learning the basic features of steel products and others used at chemical plants.

7) Drawing room

Educational materials for understanding drawings on machinery at chemical plants as well as learning basic drawing methods.

8) Studio

Equipment for producing and editing audio-visual educational materials used at this Center.

9) Agro chemical laboratory

Research equipment for technical assistance to various plants in organic chemical plants, such as petrochemical, plastic processing and synthetic fiber processing.

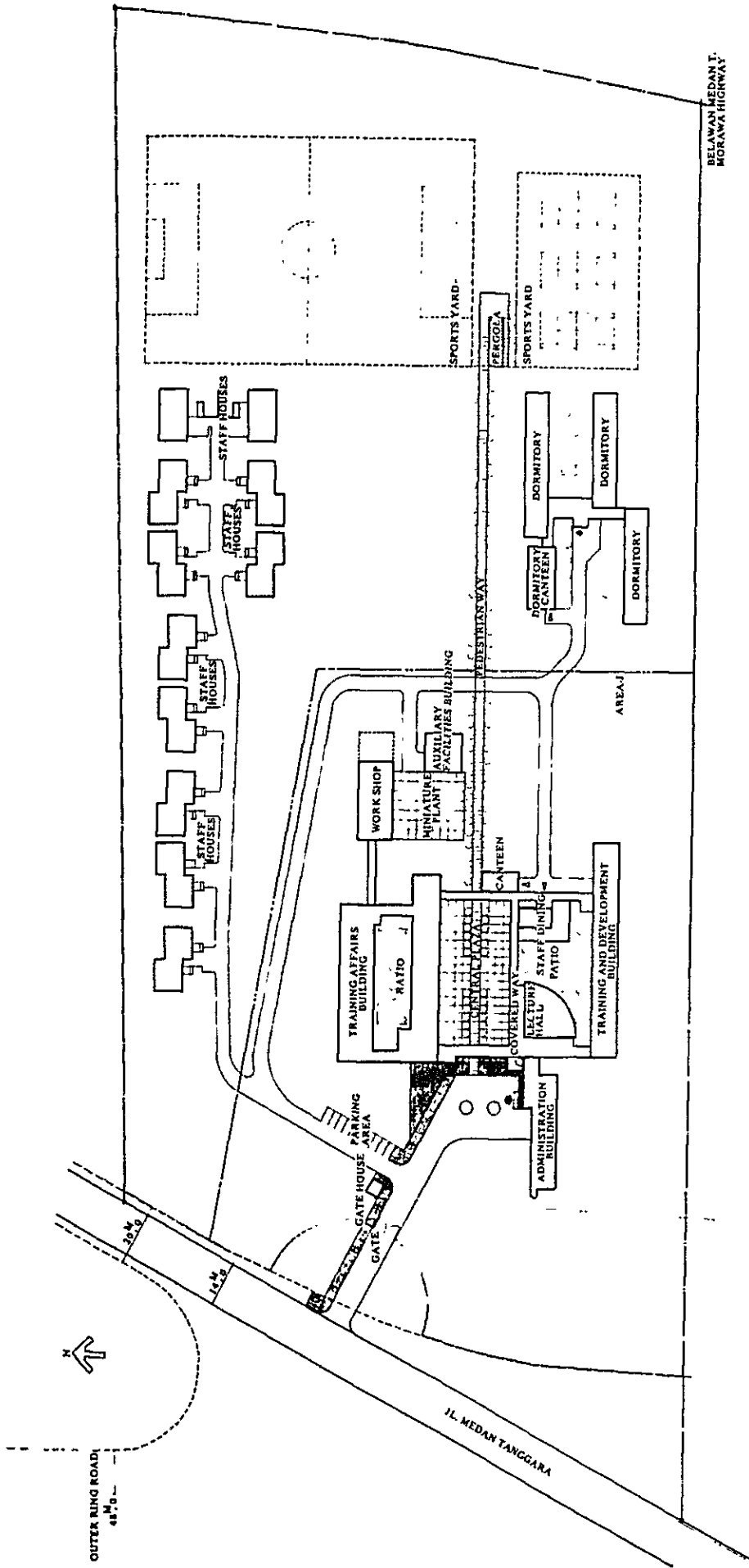
10) In-organic chemical laboratory

Research equipment for technical assistance to the inorganic chemical industry, such as plants for fertilizer, aluminum, cement and glass.

### 3. BASIC DESIGN

#### LIST OF DRAWINGS

01	SITE PLAN	
02	ADMINISTRATION BLDG.	Ground & 1st Floor Plan
03	TRAINING & DEVELOPMENT BLDG.	Ground & 1st Floor Plan
04	TRAINING AFFAIRS BLDG.	Ground & 1st Floor Plan
05	TRAINING AFFAIRS BLDG.	Elevation & Section
06	LECTURE HALL, CANTEEN	Plan & Elevation
07	WORKSHOP	Plan & Elevation
08	WATER SUPPLY SYSTEM	
09	DRAINAGE SYSTEM	
10	ELECTRIC SYSTEM	
	EQUIPMENT LIST	

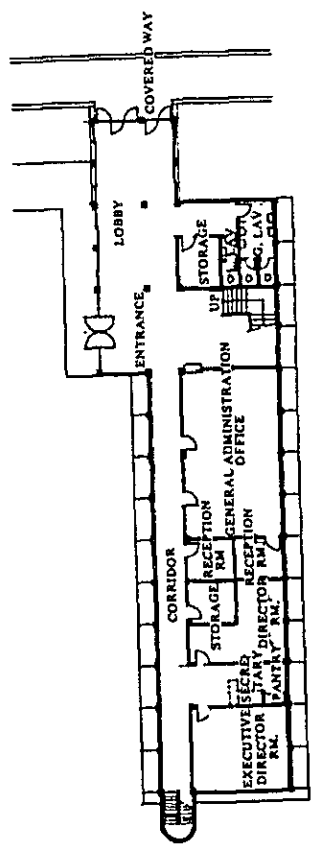


THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER

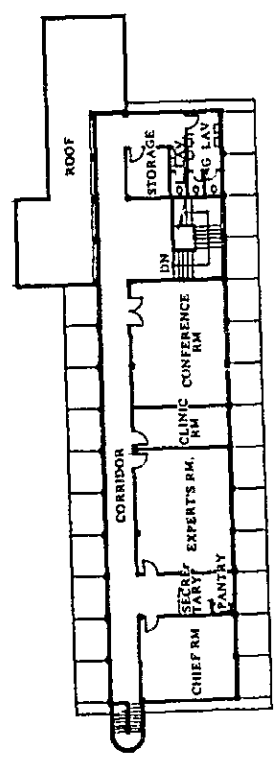
01

SITE PLAN

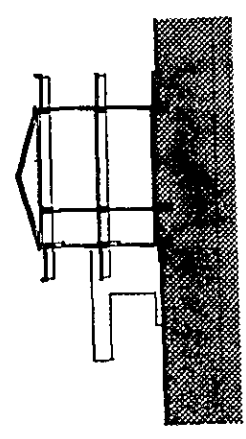




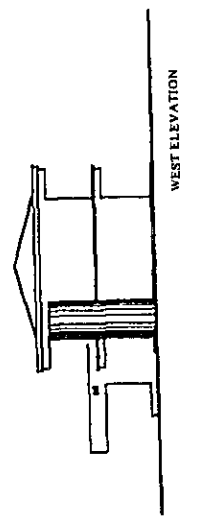
GROUND FLOOR PLAN



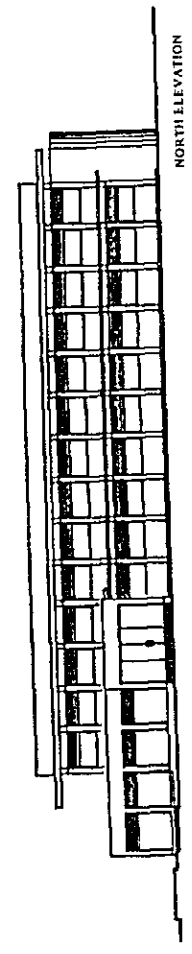
FIRST FLOOR PLAN



SECTION



WEST ELEVATION



NORTH ELEVATION



20 M

10

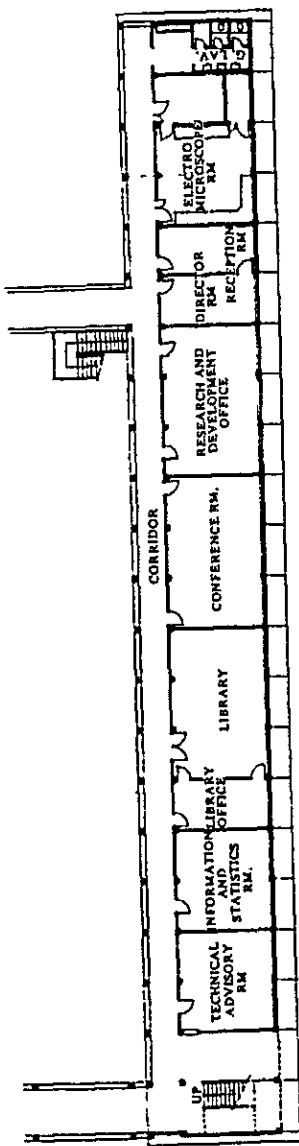
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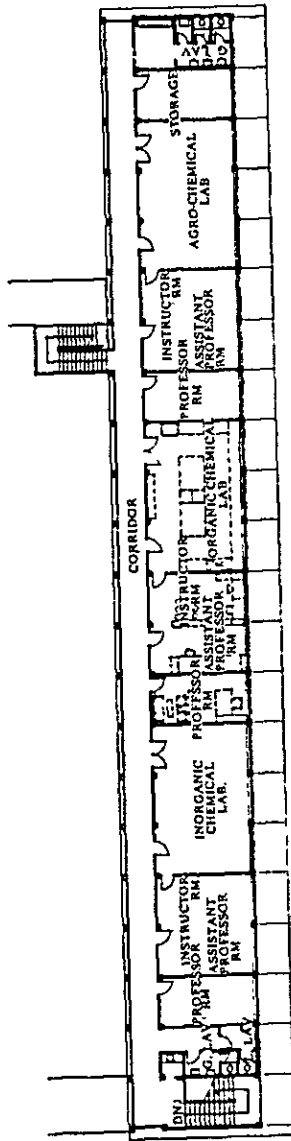
THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER  
ADMINISTRATION BUILDING



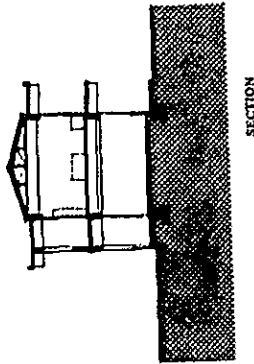




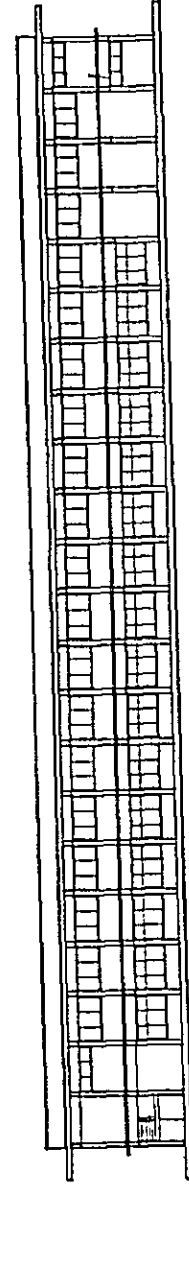
GROUND FLOOR PLAN



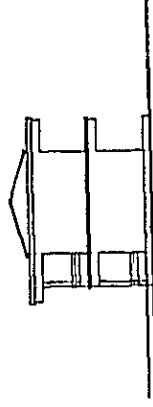
FIRST FLOOR PLAN



SECTION



SOUTH ELEVATION



WEST ELEVATION

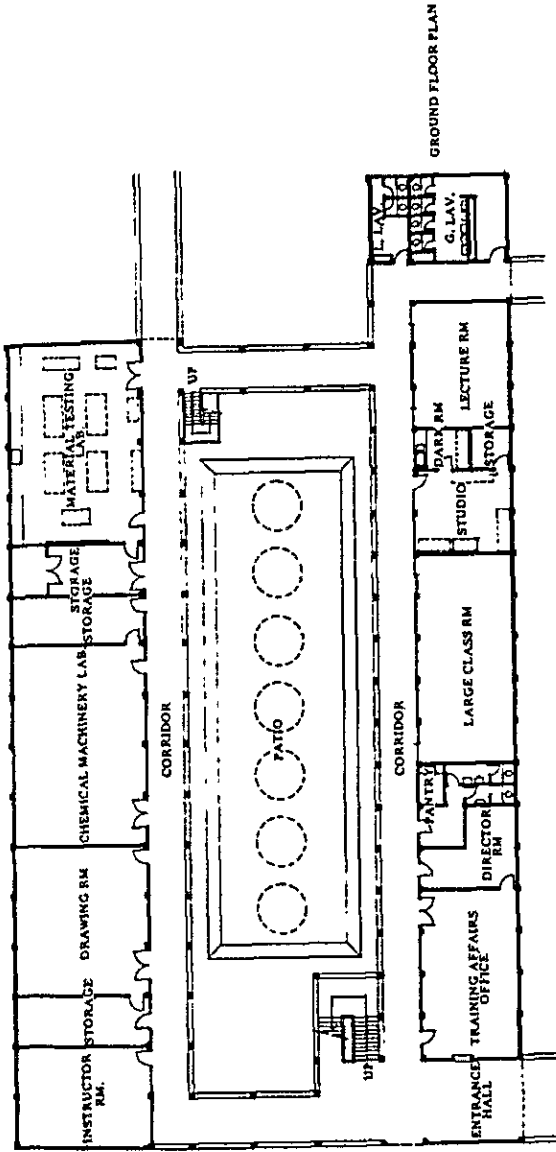


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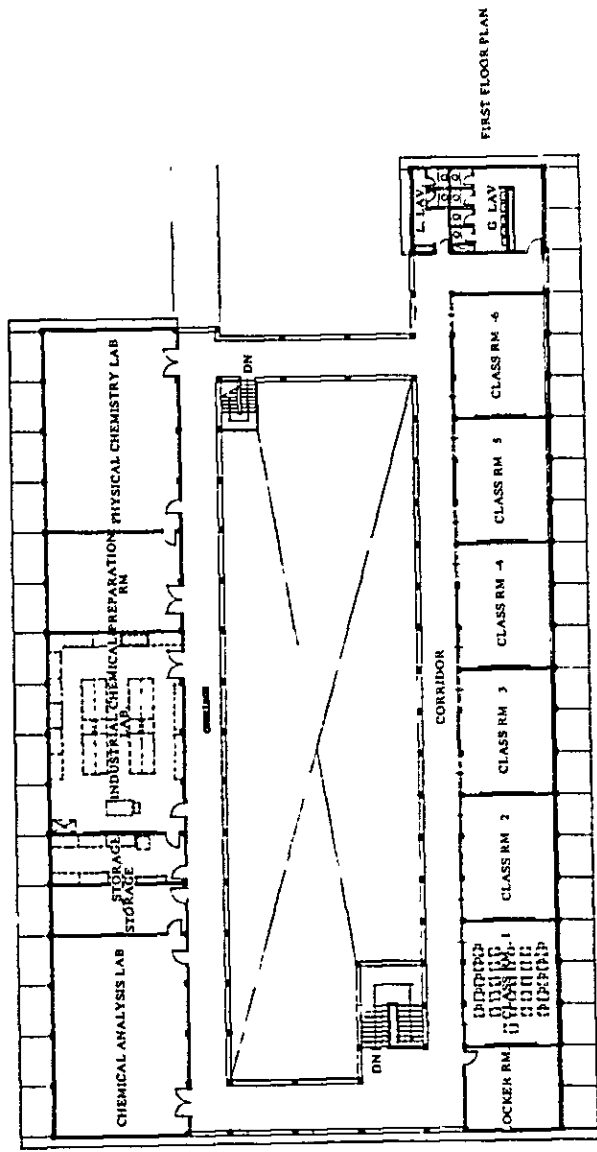
THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER  
TRAINING & DEVELOPMENT BUILDING

PLAN, ELEVATION & SECTION





GROUND FLOOR PLAN

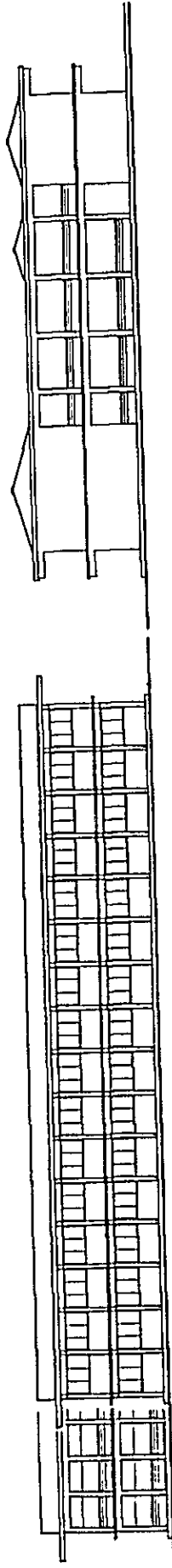


FIRST FLOOR PLAN



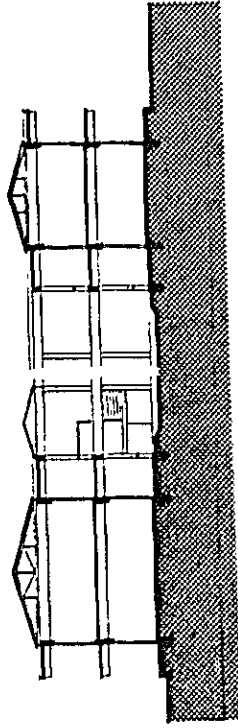
THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER  
TRAINING AFFAIRS BUILDING





WEST ELEVATION

NORTH ELEVATION



SECTION

SOUTH ELEVATION



20 M

10

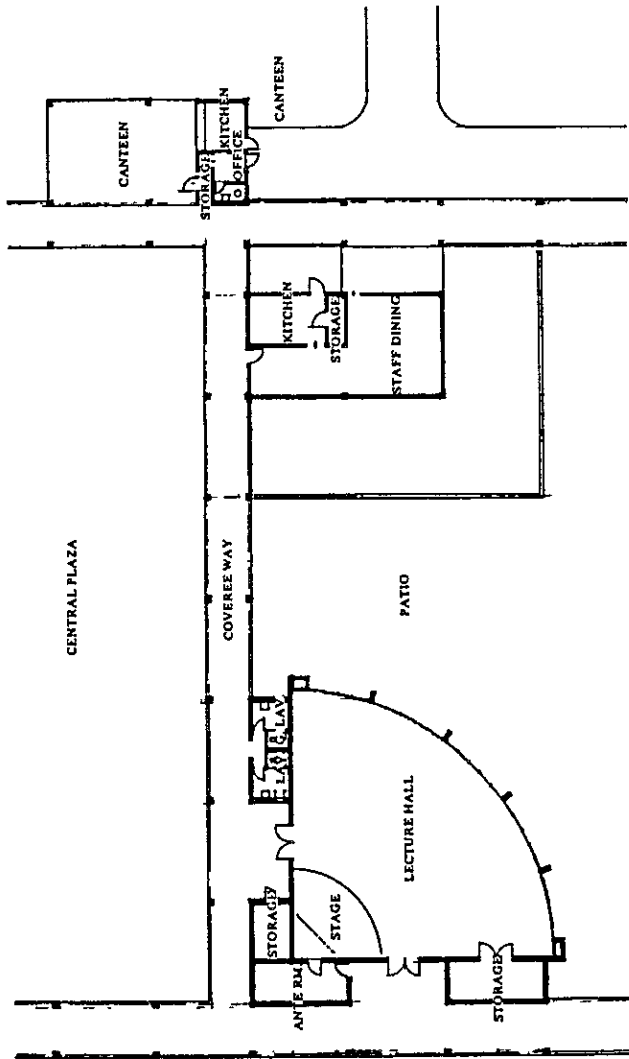
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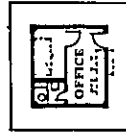
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THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER  
 TRAINING AFFAIRS BUILDING ELEVATION & SECTION

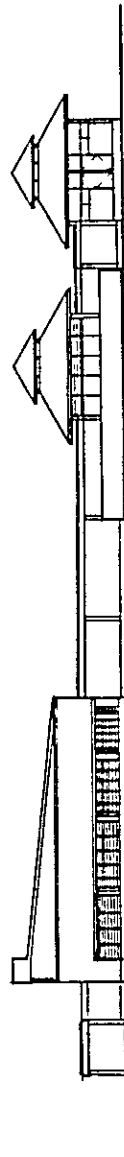




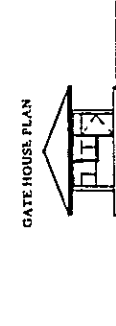
LECTURE HALL & CANTEEN PLAN



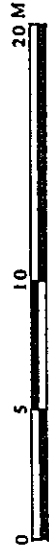
GATE HOUSE PLAN



LECTURE HALL & CANTEEN NORTH ELEVATION



GATE HOUSE SOUTH ELEVATION

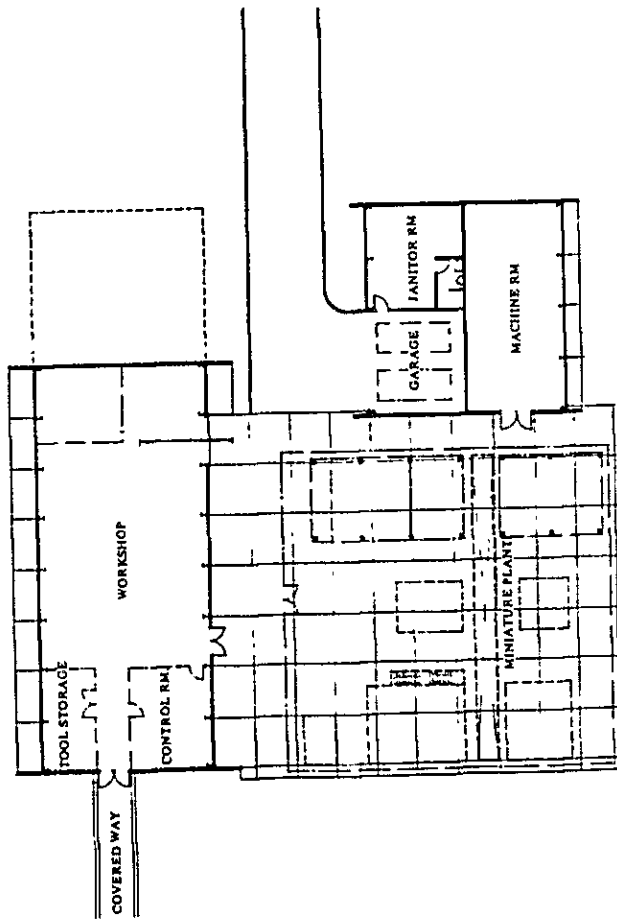


THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER  
LECTURE HALL, CANTEEN & GATE HOUSE

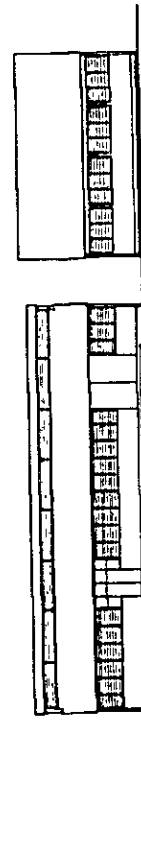
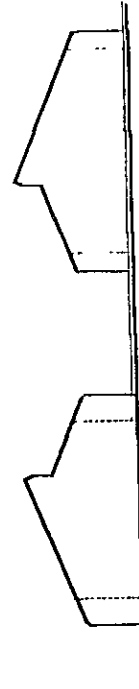
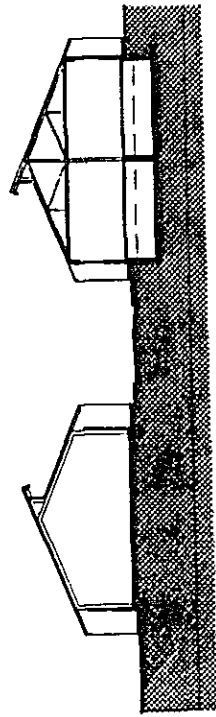
06







WORKSHOP & AUXILIARY FACILITIES BUILDING PLAN



EAST ELEVATION





NORTH ELEVATION

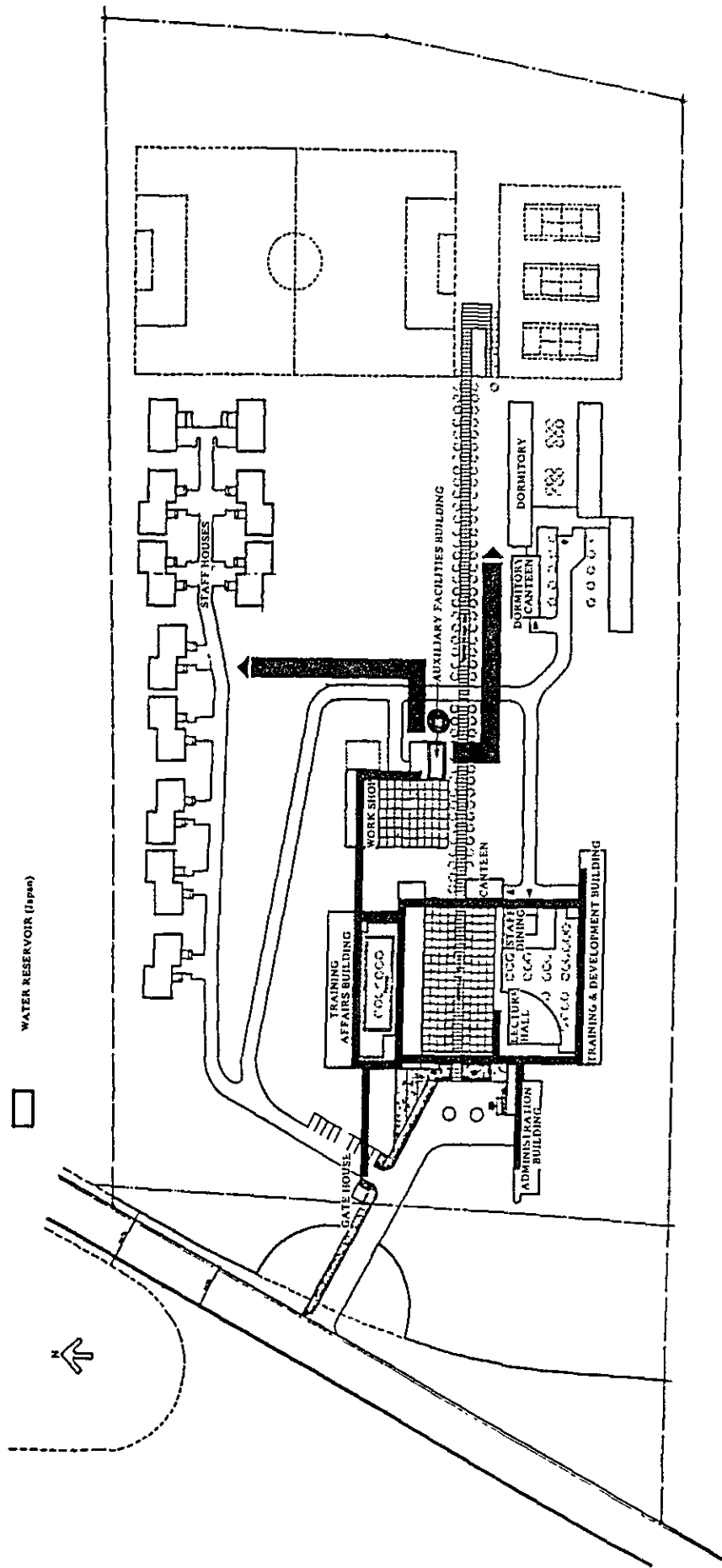


07

THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER  
WORKSHOP & AUXILIARY FACILITIES BUILDING PLAN, ELEVATION & SECTION






-  WATER SUPPLY (Indonesia)
-  WATER SUPPLY (Japan)
-  DEEP WELL (Indonesia)
-  WATER RESERVOIR (Japan)

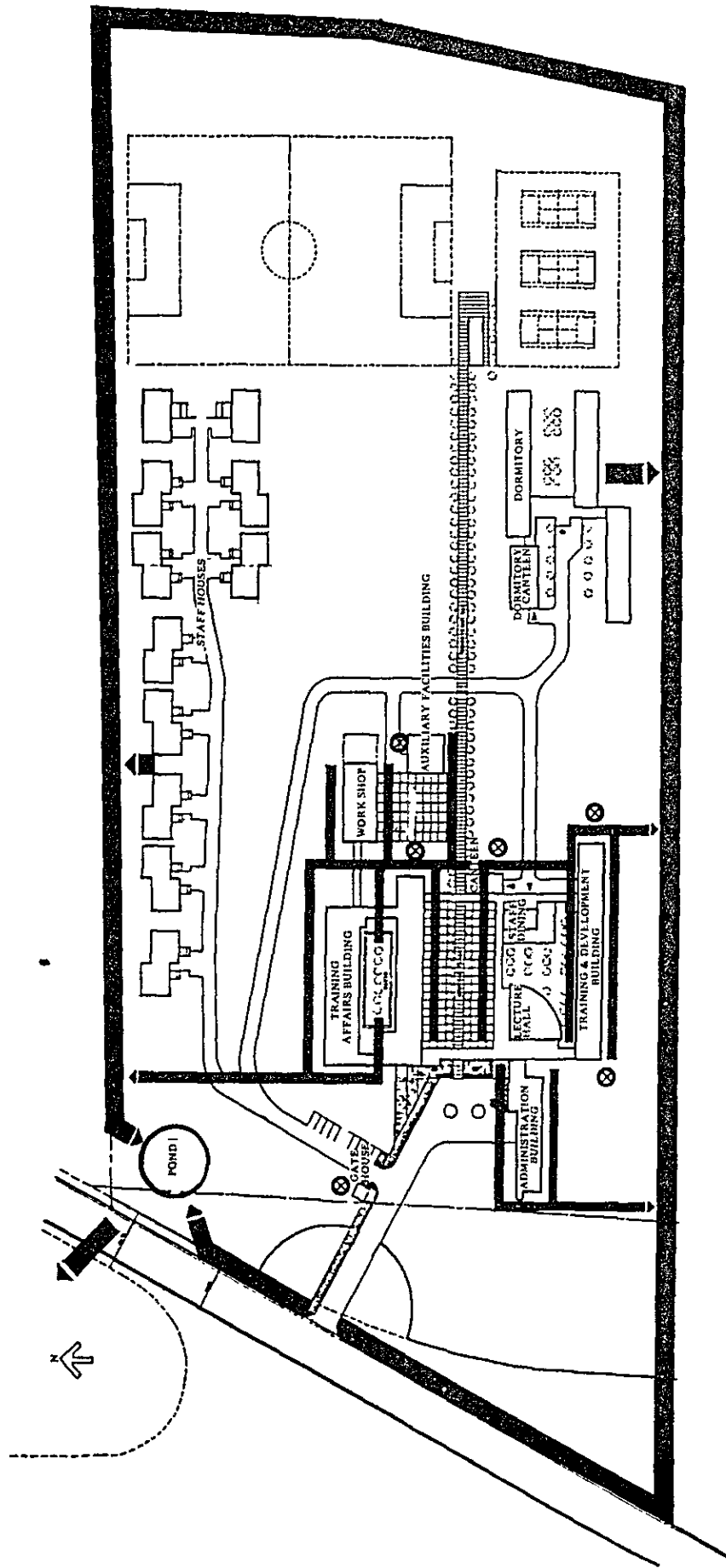


WATER SUPPLY SYSTEM

THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER



-  DRAINAGE (Indonesia)
-  DRAINAGE (Japan)
-  SEPTIC TANK (Japan)



0 10 20 50 M

THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER

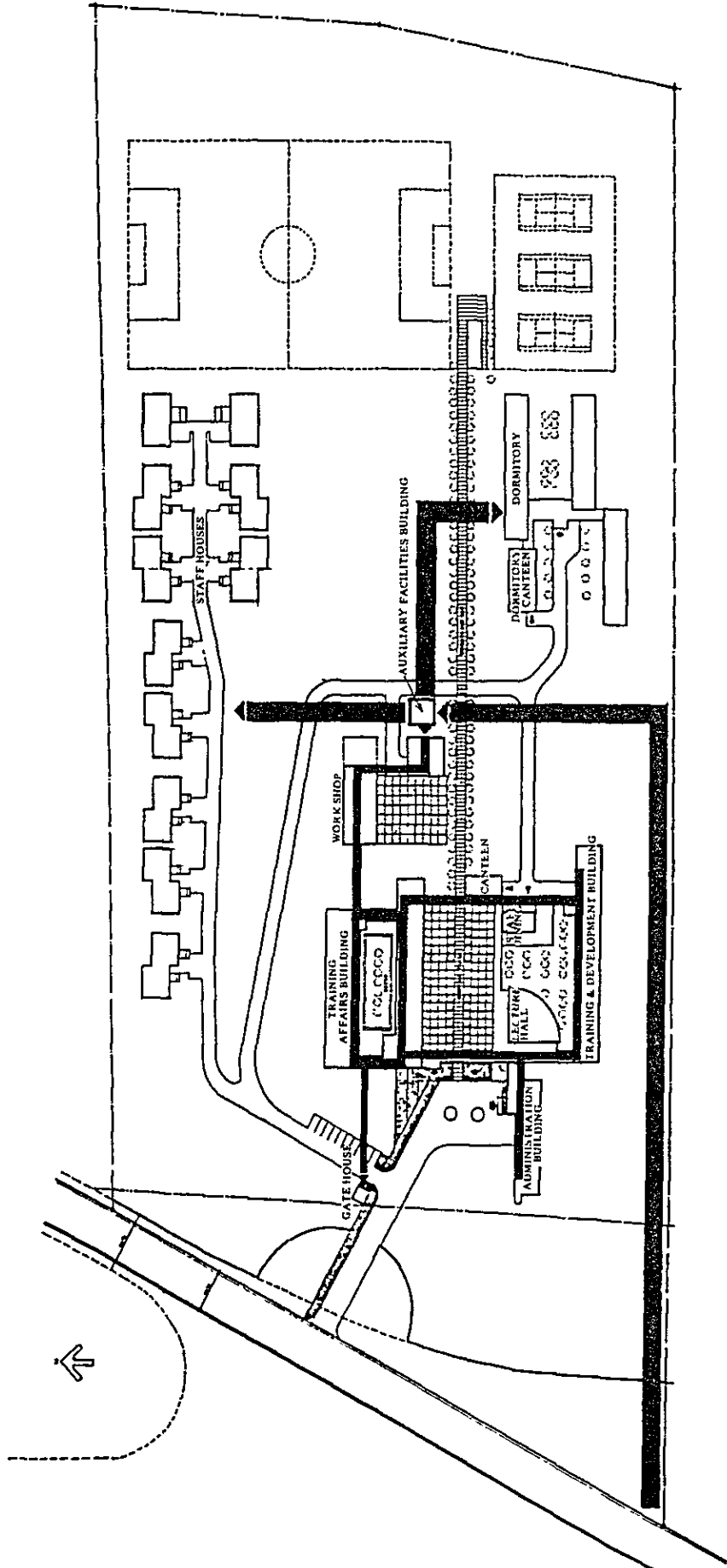
DRAINAGE SYSTEM



ELECTRIC SUPPLY (Indonesia)

ELECTRIC SUPPLY (Japan)

TRANSPORTATION SUB-STATION (Indonesia)



0 10 20 50 M

10

ELECTRICAL SYSTEM

THE CHEMICAL INDUSTRY TRAINING & DEVELOPMENT CENTER





## EQUIPMENT LIST

T.A.-1

### Chemical Analysis Lab.

Item No.	Description	Q'ty
E-1	Auto Still	1 set
E-2	Direct Reading Balance	2 sets
E-3	Demineralizer	1 set
E-4	pH Meter	5 sets
E-5	Conductivity Meter	5 sets
E-6	Crucible Furnace	1 set
E-7	Power Controller	1 set
E-8	Refrigerator, with Freezer	1 set
F-1	Fume Hood	1 set
F-2	Center Table	2 sets
F-3	Side Table	3 sets
F-4	Side Table	2 sets
F-5	Corner Unit	1 set
F-6	Working Table	2 sets
F-7	Cabinet	2 sets
F-8	Table for Instructor	1 set
F-9	Sink Unit	1 set
F-10	Sink Unit	1 set
** Preparation and Storage Room **		
F-11	Working Table	3 sets

Industrial Chemistry Lab.

Item No.	Description	Q'ty
E-1	Constant Temperature Water Bath	2 sets
E-2	Crucible Furnace	2 sets
E-3	Power Controller	2 sets
E-4	Autoclave	1 set
E-5	Uni-thermo Bath, with Viscometer	1 set
E-6	Drying Oven	2 sets
E-7	Drying Oven, infrared	1 set
E-8	Gas Analyzer (orsat)	5 sets
E-9	Balance, Direct Reading	1 set
E-10	Refrigerator, with Freezer	1 set
E-11	Auto Still	1 set
E-12	Centrifuge	1 set
F-1	Fume Hood	1 set
F-2	Center Table	2 sets
F-3	Side Table	3 sets
F-4	Side Table	2 sets
F-5	Corner Unit	1 set
F-6	Working Table	4 sets
F-7	Cabinet	2 sets
F-8	Table for Instructor	1 set
F-9	Sink Unit	1 set
	** Preparation and Storage Room **	
F-10	Working Table	3 sets

Physical Chemistry Lab.

Item No.	Description	Q'ty
E-1	Auto Still	1 set
E-2	Universal Tester	1 set
E-3	pH Meter	2 sets
E-4	Direct Reading Balance	1 set
E-5	Thermister Thermometer	1 set
E-6	Thermometer, thermocupple (CA)	1 set
E-7	Portable DC Voltage/current Standard	2 sets
E-8	Electromagnetic Direct Recording Osillograph	1 set
E-9	Melting Point Apparatus	1 set
E-10	Optical Experimental Apparatus	1 set
E-11	Photometric Colorimeter	1 set
F-1	Fume Hood	1 set
F-2	Center Table	2 sets
F-3	Side Table	3 sets
F-4	Side Table	2 sets
F-5	Corner Unit	1 set
F-6	Working Table	4 sets
F-7	Cabinet	2 sets
F-8	Table for Instructor	1 set
F-9	Sink Unit	1 set
	** Preparation and Storage Room **	
F-10	Working Table	3 sets

T.A.-G

Chemical Machinery Lab.

Item No.	Description	Q'ty
F-1	Universal Experimental Table	4 sets
F-2	Working Table	1 set
F-3	Glass Blowing Table	1 set
F-4	Cabinet	1 set

Chemical Machinery Lab. (Out door)

Item No.	Description	Q'ty
E-1	Practical Training Facility	1 set
	(1) Distillation Unit	
	(2) Water Treatment Unit	
	(3) Steam Generator	
	(4) Air Compressor Unit	
	(5) Pump Unit	
	(6) Cooling Tower	
	(7) Instrument Pannel	

Studio Lab.

Item No.	Description	Q'ty
E-1	T.V. Color Camera	1 set
E-2	Stand for T.V. Camera	1 set
E-3	Portable T.V. Camera	1 set
E-4	Carrying Cart	1 set
E-5	Rechargeable Battery Pack	1 set
E-6	Battery Charger	1 set
E-7	Car Battery Adaptor	1 set
E-8	Lighting Kit	1 set
E-9	Editing System	1 set
E-10	Monitor T.V.	1 set
E-11	Monitor Wagon	1 set
E-12	Video Cassette Recorder (Portable)	1 set
E-13	Video Cassette Recorder (Fix)	1 set
E-14	Remote Control Unit	1 set
E-15	Console	1 set
E-16	Side Projector	2 sets
E-17	Over head Projector	4 sets
E-18	Screen	4 sets
E-19	Safe light	1 set
E-20	Film Dryer	1 set
E-21	Enlarger	1 set
E-22	Miscellaneous and tool	1 lot
E-23	OHP Film Printer	1 set
F-1	Side Table	2 sets
F-2	Side Table	2 sets

Work Shop

Item No.	Description	Q'ty
E-1	Lath	2 sets
E-2	Horizontal Milling Machine	1 set
E-3	Bending Machine	1 set
E-4	Bending Rod Machine	1 set
E-5	Gas Welder	1 set
E-6	Shearing Machine	1 set
F-1	Working Table	9 sets
F-2	Cabinet	2 sets
F-3	Table	3 sets

T.A.-G

Material Testing Lab.

Item No.	Description	Q'ty
E-1	Universal Testing Machine	1 set
E-2	Micro Vicker's Hardness Tester	1 set
E-3	Strain Meter	- 2 sets
E-4	Electromagnetic Oscillography	1 set
F-1	Side Table	4 sets
F-2	Working Table	2 sets
	** Preparation and Storage **	
F-3	Working Table	3 sets

T.A.-G

Drawing Room

Item No.	Description	Q'ty
E-1	Drawing Table Set	25 sets
E-2	Side Table for above, Small type	5 sets
	" , Large type	10 sets
F-1	Table	2 sets
F-2	Cabinet	1 set
F-3	Cabinet	1 set
F-4	Drawing Cabinet	1 set
	<b>** Dark Room **</b>	
F-3	Sink Unit	1 set
F-4	Side Table	1 set
F-5	Working Table	1 set
	<b>** Storage Room **</b>	
F-6	Film Cabinet	2 sets

T.D.-1

Agro- Chemical Lab.

Item No.	Description	Q'ty
E-1	Drying Oven	1 set
E-2	Vacuum Drying Oven	1 set
E-3	Ice Making Machine	1 set
E-4	Constant temperature Water Bath	1 set
E-5	Ultrasonic Washer	1 set
E-6	Thermometer, digital	1 set
F-1	Fume Hood	1 set
F-2	Center Table	1 set
F-3	Side Table	2 sets
F-4	Cabinet	1 set
F-5	Sink Unit	1 set

T.D.-1

Organic Chemical Lab.

Item No.	Description	Q'ty
E-1	Gas Chromatograph	1 set
E-2	Infrared Spectrophotometer	1 set
E-3	Uni-Thermo Bath	1 set
F-1	Fume Hood	1 set
F-2	Center Table	1 set
F-3	Side Table	2 sets
F-4	Cabinet	1 set
F-5	Sink Unit	1 set



T.D.-1

Inorganic Chemical Lab.

Item No.	Description	Q'ty
E-1	Constant Temperature Drying Oven	1 set
E-2	Sieve Shaker	1 set
E-3	Microscope, with Photometric System	1 set
E-4	Constant Temperature Water Bath	1 set
E-5	Atomic Absorption Spectrophotometer	1 set
E-6	Auto Still	1 set
F-1	Fume Hood	1 set
F-2	Center Table	1 set
F-3	Side Table	2 sets
F-4	Sink Unit	1 set
F-5	Cabinet	1 set

T.D.-G

Scanning Electron Microscope

Item No.	Description	Q'ty
E-1	Scanning Electron Microscope	1 set
	** Preparation and Control Room **	
F-1	Side Table	1 set
F-2	Side Table	3 sets
F-3	Side Table	2 sets
F-4	Side Table	1 set
F-5	Corner Unit	1 set
F-6	Sink Unit	1 set
F-7	Sink Unit	1 set
F-8	Cabinet	1 set



## 4. PLANNING OF CONSTRUCTION

### 4-1 SCOPE OF THE CONSTRUCTION WORK

During the stay of the survey team in Indonesia, specific discussions on the scope of work of the Indonesia and that of the Japanese, and also the connection method of fundamental facilities and equipments were held on a number of occasions with officials in charge of the Education & Training Center of the Ministry of Industry.

Though the scope of work for both parties is also stated in the Summary of Discussions, the demarcation of each work will be summarized below (in which AREA-J represents the scope of work to be provided by the Japanese side. "I" denotes Indonesia while "J" denotes Japan).

#### A. Fundamental work

- 1) Site reclamation
  - a. Acquisition of land (I)
    - Acquisition of land, land survey and soil boring will be completed before preparing the working drawings.
  - b. Site preparation (I)
    - Removal of obstruction, levelling and cleaning on the site will be completed before the start of the construction.
- 2) Electricity
  - (I)
    - Providing electricity failed down from high voltage of 20KV to 380/220V through the transformer substation (Capacity: 300KVA)
  - (J)
    - Electricity supply from that point to the facilities in AREA-J.
- 3) Water supply
  - (I)
    - Providing a water supply of sufficient capacity from the deep well in AREA-J by means of submerged pump as far as the water reserved tank(J).
  - (J)
    - Providing a water supply from that point to the facilities in AREA-J by means of an automatic pressure pump.
- 4) Telephone
  - (I)
    - Leading-in of the telephone trunk line (One line) to the telephone exchange (J).
  - (J)
    - Setting up the telephone equipment, wiring and conduits in AREA-J from the point.
- 5) Drainage
  - (J)
    - Securing drainage facilities and septic tank in AREA-J.

## B. Facilities and exterior work

- 1) Facilities
  - (I)
    - Staff Housings, Student dormitory (Equipped with Dormitory canteen).
  - (J)
    - Main Building
      - Training Development Building
      - Training Affairs Building (Incl. Work shop), Lecture Hall
      - Gate House
      - Utilities (Incl. emergency generator)
      - Student Canteen, Staff's Canteen
- 2) Exterior works
  - (I)
    - Fence (Except the fence along the road in front of the site).  
Sodding, plantation.
  - (J)
    - Gates and fence (For only section facing the road in front of the proposed site).  
Roads in the premises and their pavements.
- 3) Furniture & equipment
  - (J)
    - Office furniture and miscellaneous for all facilities in the site.
- 4) Equipment and instruments for educational training
  - (J)
    - Installation of equipment and instruments for educational training in the facilities within the Grant budget.
- 5) Transportation of materials
  - (J)
    - Packing of materials and equipment to be exported from Japan; insurance charges; loading onto vessels at port of Japan and marine transportation and inland transportation in Indonesia.
  - (I)
    - Taking various necessary procedures in obtaining the permissions and exemptions of the custom duties and taxes from the respective authorities of the Government of the Republic of Indonesia for Construction materials, equipment, construction machines, etc.
- 6) Others
  - (I)
    - Providing all running expenses for the operation of the Centre.
    - Securing expenses for providing services of the Indonesian Counterpart personnel necessary for the operation of the Centre.
    - Necessary action and procedures to help the Japanese nationals concerned for the Project enter in an out and/or to travel in Indonesia will be taken.

## 4-2 SCHEDULE OF THE CONSTRUCTION WORK.

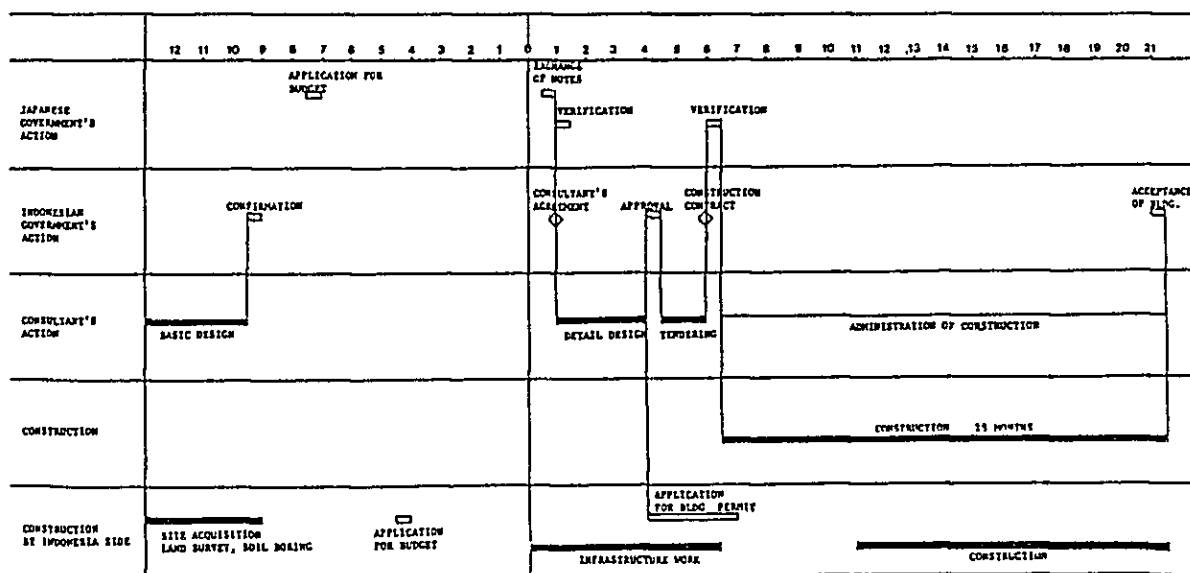
The work for preparation of working drawings relating to this subject facilities construction under the grant program will commence following the conclusion of the exchange of official notes between both governments.

During this stage of the preparation of working drawings, design plans and specifications necessary for the work will be prepared and the contract documents for the tender will be made.

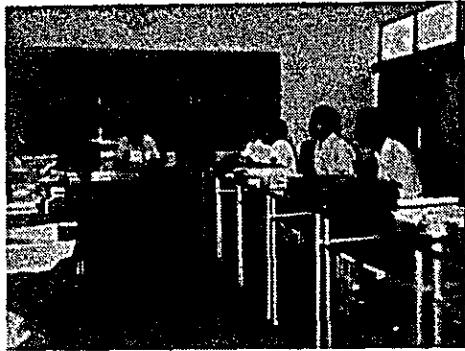
Approval of the owner will be obtained on all documents for construction, after appropriate tenderers are invited for tendering.

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

Judging from the scale, structure and contents of equipment of the subject facilities, the period that will be required is approximately 15 months.



TENTATIVE CONSTRUCTION SCHEDULE



COURTESY VISIT TO  
EDUCATION & TRAINING CENTER  
M.O.I

DATE: 25 MAR. 1980  
PLACE: Education & Training Center



DISCUSSION WITH  
REGIONAL OFFICE, M.O.I

DATE: 31 MAR. 1980  
PLACE: Regional Office, MOI



DISCUSSION WITH EDUCATION &  
TRAINING CENTER, M.O.I

DATE: 11 APR. 1980  
PLACE: Education & Training Center



SIGNING OF  
SUMMARY OF DISCUSSIONS

DATE: 12 APR. 1980  
PLACE: Education & Training Center



SIGNING OF MINUTES  
DATE: 10 JUN. 1980  
PLACE: Hotel Kartika Chandra

## 5. DISPATCH OF THE BASIC DESIGN SURVEY TEAM

### 5-1 PURPOSE OF SURVEY

Indonesia is planning to attain an annual 11% of economic growth in its industrial sector within the period of the third five-year economic development program. Stress has been especially laid on the development of chemical industry (Organic, Inorganic, agricultural chemistries, cellulose and rubber chemical industries etc.), but the problem of shortage in the Middle class engineers is currently a great concern in Indonesia, and in order to cope with this situation, the Ministry of Industry in Indonesia is planning to construct Sumatra Chemical Industry Training and Development Center which is expected to provide engineer training, technical development, technical guidance, technical information services etc., and has requested the technical cooperation and a grant aid to the Government of Japan.

The Government of Japan understood that this project is aimed at establishing a technical research and development center leading chemical industries by which engineers and technicians will be trained, and technical development will be attained and technical information will be provided in Indonesia where a rapid progress in chemical industry based on the abundant underground resources is expected, and that the contribution to enlargement of employment, stabilization of social welfare and economic development of Indonesia by the Japanese Grant Aid will promote the relationship between the two countries, which have been maintaining the friendly relation and cultural exchange over centuries.

Therefore, the Government of Japan dispatched the Preliminary Survey Team on September 1979 in order to fully understand the substance of the requirement in reply to the request of the Government of Indonesia.

The Basic Design Survey Team was dispatched to carry out the basic design for the construction of the Sumatra Chemical Industry Training and Development Center based on the results of this preliminary survey.

## 5-2 CIRCUMSTANCES OF THE DISCUSSIONS

The basic survey team was engaged in necessary field survey and discussions with related Indonesian Authorities.

The main Authority concerned was the Education training center of the Ministry of Industry.

Detailed discussions were held particularly with the members of the Educational training center which is expected to be the central administrative body of the projected center.

During the course of the basic design survey, the team carried out the actual land surveying of the third proposed site which was selected by the preliminary survey team and found that the site was in the trouble with the land owner and the team was forced to conduct a survey on the site newly proposed by the Ministry of Industry.

As a result of a careful survey on the proposed site, the survey team judged that the proposed site "C" was the optimum and recommended to the Indonesian Government concerned and the Indonesian side acknowledged that the construction of the projected center was constructed on the site "C" and some minor amendments had been made on the master plan prepared by the survey team to obtain final approval.

During the second survey, the matters agreed upon between both parties were compiled in the form of the Minutes, which were signed by the representatives of Education Training Center of MOI, and the Survey Team Leader.



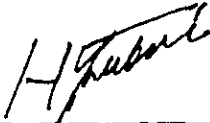
MINUTES ON THE CHEMICAL INDUSTRY  
TRAINING AND DEVELOPMENT CENTER  
LOCATED IN MEDAN, NORTH SUMATRA


At the request of the Government of the Republic of Indonesia for assistance in establishing the Chemical Industry Training and Development Center ( hereinafter referred to as the "Center" ), the Government of Japan through the Japan International Cooperation Agency ( hereinafter referred to as "JICA" ) sent a preliminary survey team on September, 1979 and basic design team on March, 1980 to the Republic of Indonesia.

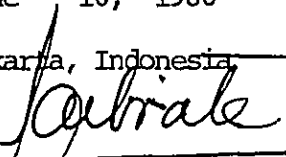
In order to explain the details of the results of the aforementioned surveys and to exchange views with the Indonesian Authorities concerned on the establishment of the Center, the present survey team of JICA headed by Dr. HIROSHI TSUBOI, JICA Executive Advisor, visited the Republic of Indonesia from June 3, 1980 to June 12, 1980.

During a series of discussions, the Indonesian side fully understood the explanation made by the Japanese Team on the Draft Summary Report and expressed its appreciation for the cooperation extended so far by the Japanese side in the preparatory stage for facilitating the Center project.

As a result of the discussions, both sides have agreed to recommend to their respective Government to take such necessary measures for establishing the Center as described below.

  
Dr. HIROSHI TSUBOI  
JICA Executive Adviser  
Mining & Industrial Development  
Cooperation Department



June 10, 1980  
Jakarta, Indonesia  
  
Ir. SOEBROTO  
Chief of  
Education & Training Center  
Ministry of Industry

J I C A

1. The Center will be constructed at Jl. Medan - Tenggara, Medan, North - Sumatra, Indonesia.

2. The objectives of the Center are :

(a). To train chemical engineers and technicians and contribute to industrial development in Indonesia, within the framework of employment and stabilization of the people's livelihood.

(b). To develop appropriate technology under specific conditions in Indonesia by means of technical development.

(c). To play a main role in developing regional as well as national industry through technical advisory service.

3. The organization of the Center.

The organization chart of the Center and the number of staffs proposed will be shown in ANNEX I.

4. Measures to be taken by the Government of Japan.

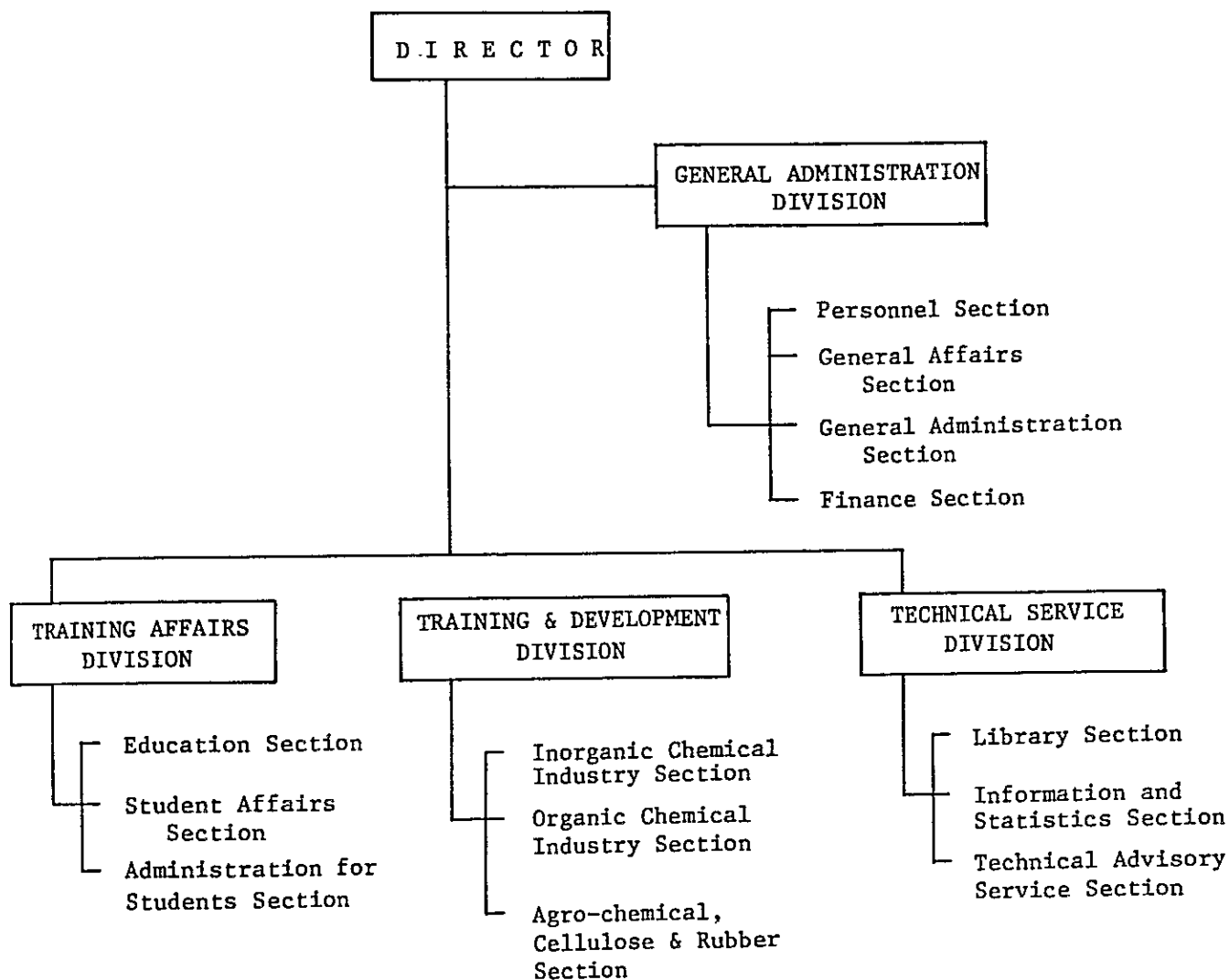
The Government of Japan will take necessary measures to provide such items as listed in ANNEX II and IV.

The layout plan of the Center is shown in ANNEX III.

5. Measures to be taken by the Government of the Republic of Indonesia.

The Government of the Republic of Indonesia will take necessary measures to provide such items as listed in ANNEX V.

ANNEX I  
ORGANIZATION CHART



4 Divisions 13 Sections

Total Staff Number :

Maximum 60

ANNEX II

BUILDINGS AND UTILITIES TO BE PROVIDED BY THE GOVERNMENT OF JAPAN

(1) . Buildings

- a) . Administration Building
- b) . Training Affairs Building
- c) . Training and Development Building
- d) . Student's Canteen and Staff's Canteen
- e) . Work Shop
- f) . Lecture Hall
- g) . Gate House
- h) . Utility.

(2) . Outdoor Works





- a) . Gate and Fence ( frontside )
- b) . Pavement within the Site
- c) . Drainage system
- d) . Outdoor Lightings
- e) . Septic Tanks.

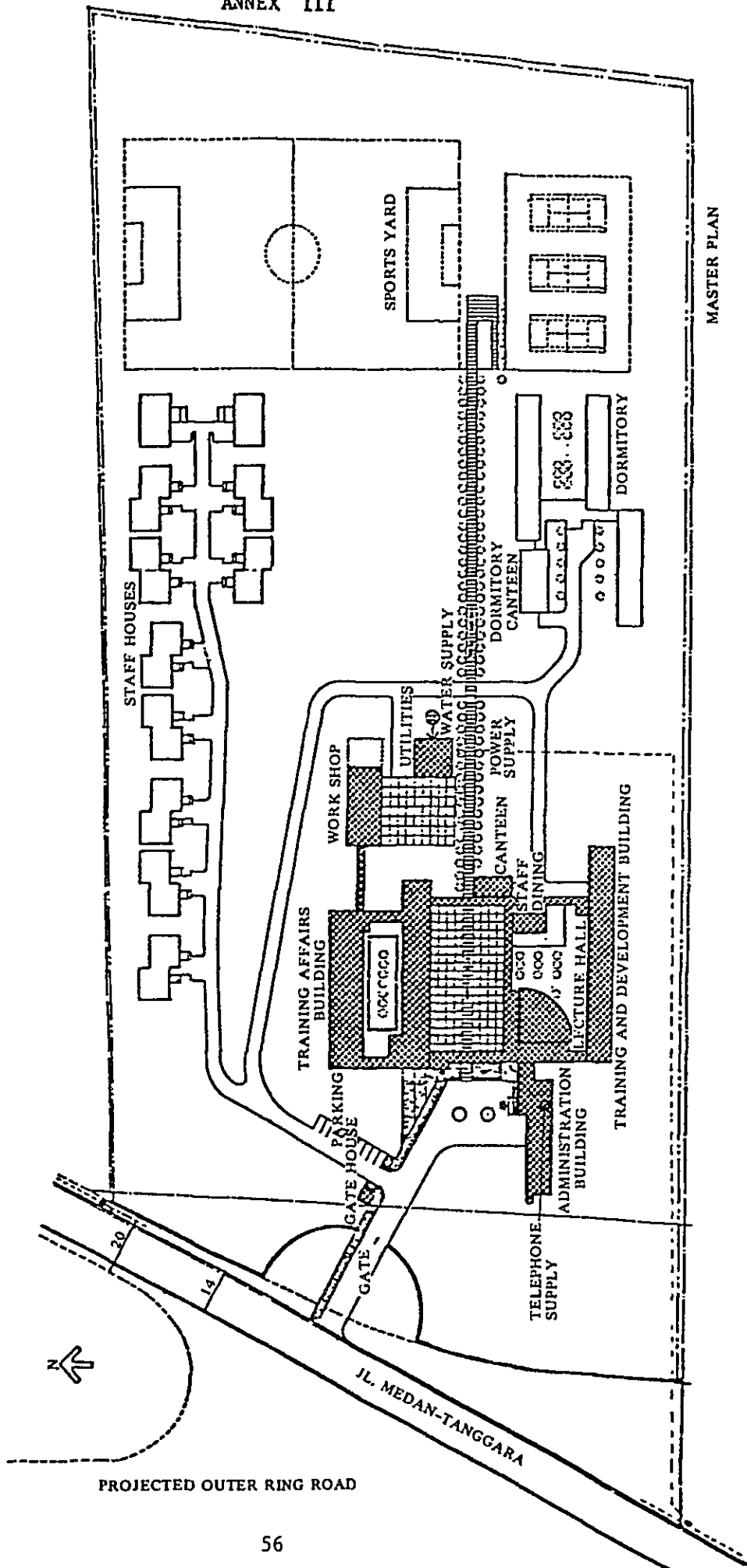
(3) . Furniture and Drapes ( Working Tables, Center Tables, Venetian Blinds, etc. )

(4) . Detail Design and Supervisory Services.

ANNEX III

(5)

-  BUILDING TO BE PROVIDED BY JAPANESE GOVERNMENT
-  BUILDING TO BE PROVIDED BY INDONESIAN GOVERNMENT
-  FENCE TO BE PROVIDED BY JAPANESE GOVERNMENT
-  FENCE TO BE PROVIDED BY INDONESIAN GOVERNMENT



MASTER PLAN

ANNEX IV

EQUIPMENT AND MACHINERIES TO BE PROVIDED BY THE GOVERNMENT OF JAPAN

- 1). Analytical Equipment
  - a). Gas chromatograph
  - b). PH - meter
  - c). Balances
  - d). Potentiometric titration
  - e). Solution electrical conducto-meter
  - f). Infrared spectrometer
  - g). Spectrophotometer
  - h). Liquid chromatograph
  - i). Thermal analysis equipment
  - j). Scanning electron microscope
  - k). Others.
- 2). Chemical Engineering Equipment
  - a). Distillation apparatus
  - b). Pumps
  - c). Fluid flow testing apparatus
  - d). Others.
- 3). Measuring Tools and Instruments
  - a). Microscope
  - b). Thermo-meter
  - c). Wheatstone bridge
  - d). Pressure meter
  - e). Flow meter
  - f). Others.
- 4). Drafting Instruments
  - a). Drafting tool
  - b). Drafting table set
  - c). Others.

- 5). Machines and Tools for Metal Work
  - a). Lathe
  - b). Welding machine and welding tool
  - c). Others.
- 6). General Experiment Equipment
  - a). Dryer
  - b). Electric furnace
  - c). Constant Temperature bath
  - d). Stirrer mixer
  - e). Grinder crusher
  - f). Vacuum experiment instrument
  - g). Centrifuge
  - h). Filter
  - i). Optical instrument
  - j). Glass equipment
  - k). Others.
- 7). Low Temperature Experiment Equipment
- 8). Electrical Instrument and Automatic Control Experimental Equipment
- 9). Practical Training Facility
  - a). Distillation equipment
  - b). Pumps
  - c). Water Treatment equipment
  - d). Others.

## ANNEX V.

## ITEMS TO BE PROVIDED BY THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

- 1). To acquire the land necessary for the Center including land survey, soil test and necessary land reclamation.
- 2). Electrical power supply as 380 voltage line to the site by installation of transformer.
- 3). To drill one deep well and install submerged pump for supplying water to the Water Reservoir provided by the Government of Japan.
- 4). Setting pond for waste water from the Center.
- 5). One Telephone main line to the Center.
- 6). Fence Work as specified in ANNEX III.
- 7). Furniture & Drapes (except for those to be provided by the Government of Japan)
- 8). Landscaping.
- 9). 20 Units staff Housings in the Site.
- 10). Dormitory and Dormitory Canteen as specified in ANNEX III.
- 11). Taking various necessary procedures in obtaining the permissions and exemptions of the custom duties and taxes from the respective authorities of the Government of the Republic of Indonesia for :
  - Japanese nationals concerned for the Project
  - Construction materials, equipment, construction machines, etc.
- 12). Securing expenses for providing services of the Indonesian Counterpart personnel necessary for the operation of the Center.
- 13). Providing all running expenses for the operation of the Center.



SUMMARY OF DISCUSSIONS

Between the Government of the Republic of Indonesia and the basic design team sent by the Government of Japan on the Chemical Industry Training and Development Centre located in Medan, Sumatra.

At the request of the Government of the Republic of Indonesia for assistance in establishing the Chemical Industry Training and Development Centre ( hereinafter referred to as the "Centre"), the Government of Japan has sent through Japan International Cooperation Agency ( hereinafter referred to as "JICA" ) a survey team headed by Dr. HIROSHI TSUBOI, JICA Executive Adviser, to conduct a basic design survey on the program for 21 days from March 24, 1980.

The team had a series of discussions with the Education and Training Centre, Ministry of Industry, headed by Ir. SOEBROTO for exchanging views concerned on the construction and equipment for the Centre as follows.


April 12, 1980  
Jakarta, Indonesia



---

Dr. HIROSHI TSUBOI  
JICA Executive Adviser,  
Mining & Industrial Development  
Cooperation Department,

J I C A



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SOEBROTO  
Chief of  
Education & Training Centre  
Ministry of Industry

ATTENDANT AT THE DISCUSSIONS

INDONESIA GOVERNMENT CONCERNED

BASIC SURVEY TEAM

Ir. SOEBROTO : Chief of Educational  
and Training Center  
Ministry of Industry

Dr. H. TSUBOI : Team Leader JICA Expert  
Mining & Industrial  
Development Cooperation  
Department JICA

Mr. Ir. SOEBAGYO : Educational & Training  
SOEMADI Center Ministry of  
Industry

Mr. M. TANAKA : Team Member  
Advisory Staff, Japan  
Chemical Industry  
Association

Mr. SOETIKNO : - " -

Mr. S. MATSUDA : Team Member  
Executive Director,  
Kume Architects-Engineers

Mr. M. SOETEDJO : - " -

Mr. Y. KAWABE : Team Member  
Architect,  
Kume Architects-Engineers

Mr. DULRASJID : - " -

Mr. N. HORIE : Team Member  
Engineer,  
Kume Architects-Engineers

Mr. Ir. SJAIFUL : Bureau of Planning  
TAZAR Ministry of Industry

Mr. S. NAGATA : Team Member  
Engineer,  
Kume Architects-Engineers

Mr. Drs. JUZINIR : - " -  
MUZAHAR

Mr. T. MOROOKA : Team Coordinator  
JICA Staff,  
Mining & Industrial  
Development Cooperation  
Department JICA

Mr. Ir. RIDWA .R.: - " -  
PENGADILAN

EMBASSY OF JAPAN

Mr. Drs. OTON : Bureau of Finance  
SAUDI Ministry of Industry

Mr. H. TSUKAMOTO: First Secretary  
Embassy of Japan

Mr. Ir. SAADUDIN : Ministry of Finance

Mr. Drs. SUJONO : Bureau of Human Relation  
Ministry of Industry

Mr. M. SUGIHARA : Second Secretary  
Embassy of Japan

Dra. SUWARTI : BAPPENAS

1. The Center will be constructed at Jl. Medan - Tenggara, Medan, North Sumatra, Indonesia.
2. The objectives of the Center are :
  - (a) To train engineers and technicians and contribute to industrial development in Indonesia, with increase of the opportunity of employment and stabilization of the people's livelihood.
  - (b) To develop appropriate technology under specific conditions in Indonesia by means of technical development.
  - (c) To play a main role of regional industry through technical advisory service.
  - (d) To make advance and investment of companies easy with trained personnel and transferred technology.
3. The functions of the Center are :
  - 3.1. The organization chart of the Center and the number of teachers and staffs will be as shown in ANNEX I.
  - 3.2. The scheme of training of the Center will be as shown in ANNEX II.
  - 3.3. The lectures for Academy course will be as shown in ANNEX III.
4. The survey team exchanged views with the Indonesian Government concerned and both parties have agreed to recommend to their respective Governments to take necessary measures as follow.
  - 4.1. Measures to be taken by the Government of Japan.

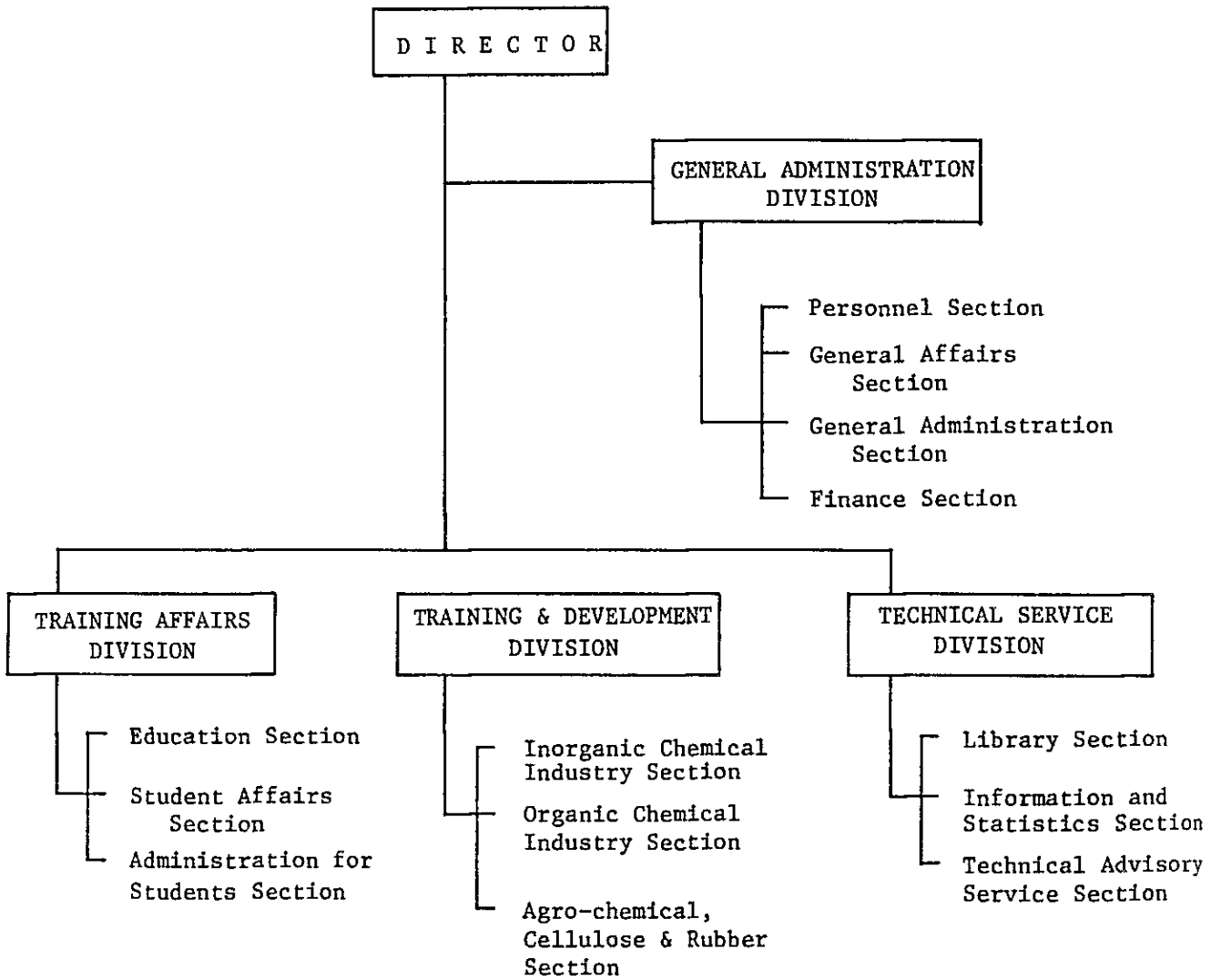
The Government of Japan will take necessary measures to provide such items as listed in ANNEX IV and VI.  
The layout plan of the Center is shown in ANNEX V.
  - 4.2. Measures to be taken by the Government of the Republic of Indonesia.

The Government of the Republic of Indonesia will take necessary measures to provide such items as listed in ANNEX VII.
5. Remarks

The Indonesian Government concerned expressed strongly to the Survey Team to provide Dormitory as an essential factor of the Center and also to provide technical cooperation for the Center.

ANNEX I

ORGANIZATION CHART



4 Divisions 13 Sections

Total Staff Number :

Maximum 60

THE SCHEME OF TRAINING

Items Course	Period	Number of Students	Requirements for Admission	Training Target	Class Design
Academy Course Chemical Engineering Course Mechanical Engineering Course	3 Years	Students :  150 (Maximum)	1. Graduates from Senior High schools or technical high schools  2. Those equipment to senior high schools or technical high schools in ability	1. To secure middle class engineers in the fields of operation, maintenance and engineering necessary for chemical industries.  2. To give basic technical knowledge and ability for chemical industries	6 class rooms
Short Training Course		Trainees : 10 - 15	These trainees from companies	To train engineers from companies to brush up their theoretical knowledge and practical skills for chemical industries	1 class rooms

## ANNEX III

### Lectures (Draft)

#### 1. First year

- 1) English language
- 2) Sociology
- 3) Mathematics
- 4) Physics
- 5) Chemistry
- 6) Industrial instrumentation
- 7) Drafting
- 8) Physical education
- 9) Others

#### 2. Second year

##### 2-1 Chemical engineering

- 1) Chemical engineering
- 2) Inorganic industrial chemistry
- 3) Organic industrial chemistry
- 4) Physical chemistry
- 5) Chemical apparatus
- 6) Quality control
- 7) Electric engineering
- 8) Information management
- 9) Environmental technology
- 10) Others

##### 2-2 Mechanical engineering

- 1) Mechanical engineering
- 2) Chemical apparatus
- 3) Metalcraft
- 4) Machine design and drafting
- 5) Strength of materials

- 6) Information management
- 7) Electric engineering
- 8) Quality control
- 9) Others

3. Third year ( both courses of chemical engineering and mechanical engineering )





- 1) Plant operation training by training equipments
- 2) Process analysis
- 3) Hydrodynamics
- 4) Hi-pressure technology
- 5) Plant management
- 6) Graduation thesis
- 7) Others

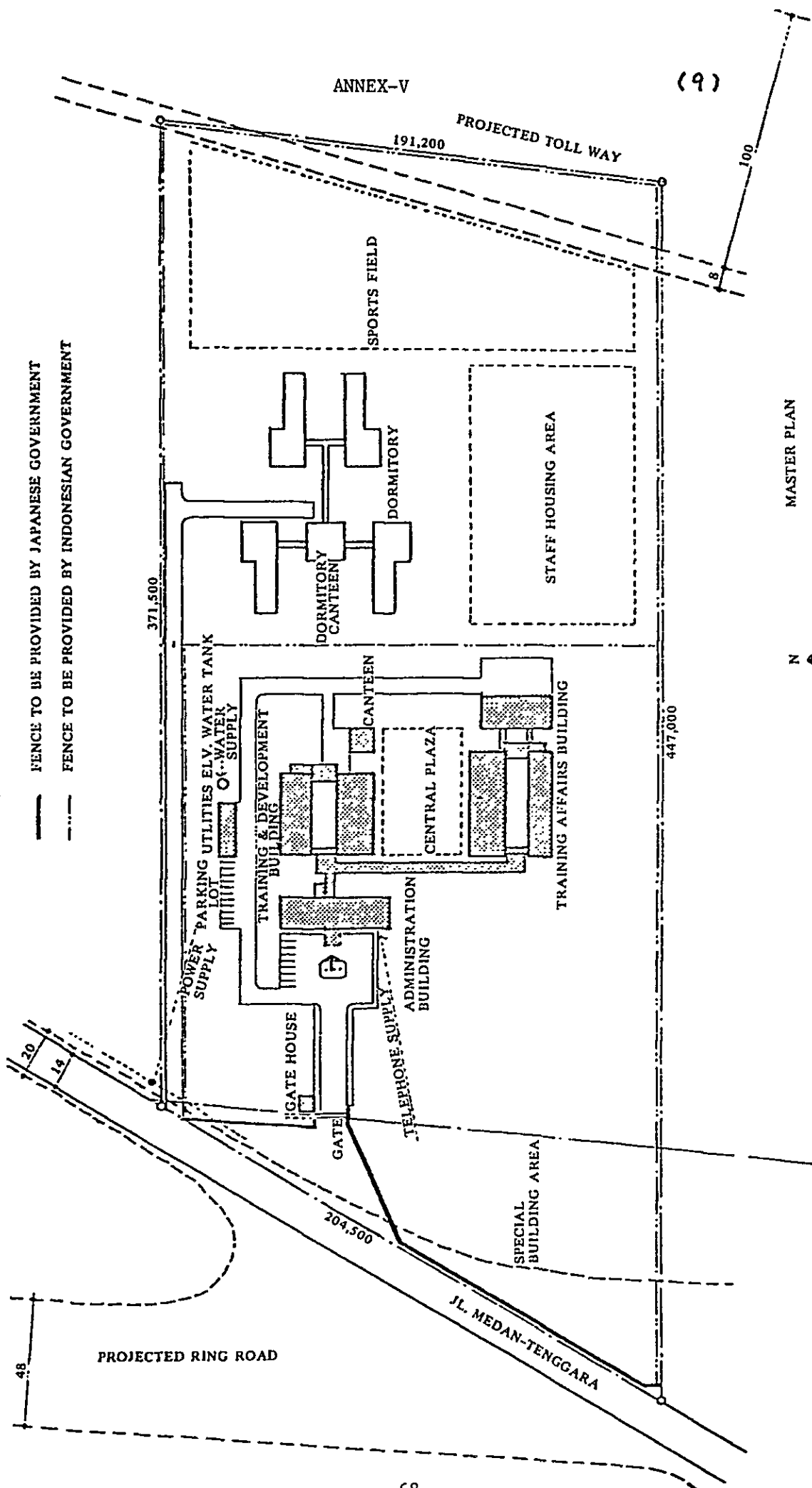
## ANNEX IV

Buildings and Equipment for the Center to be provided by the Government of Japan

- 1) Buildings
  - a) Administration Building
  - b) Training and Development Building
  - c) Training Affairs Building including Work Shop
  - d) Gate House
  - e) Utility Building including Generator
  - f) Canteen
  
- 2) Outdoor Works
  - a) Gate and Fence ( frontside )
  - b) Pavement within the Site
  - c) Drainage system
  - d) Outdoor Lightings
  - e) Septic Tanks
  - f) High Elevated Water Reservoir
  
- 3) Furniture and Drapes
  
- 4) Laboratory Equipment and Educational Equipment as listed ANNEX VI.
  
- 5) Detail Design and Supervisory Services.



-  BUILDING TO BE PROVIDED BY JAPANESE GOVERNMENT
-  BUILDING TO BE PROVIDED BY INDONESIAN GOVERNMENT
-  FENCE TO BE PROVIDED BY JAPANESE GOVERNMENT
-  FENCE TO BE PROVIDED BY INDONESIAN GOVERNMENT



ANNEX VI

EQUIPMENT AND MACHINERIES TO BE INSTALLED

- 1) Analytical equipment
  - a) Gas chromatograph
  - b) PH - meter
  - c) Balances
  - d) Potentiometric titration
  - e) Solution electrical conducto-meter
  - f) Infrared spectrometer
  - g) Spectrophotometer
  - h) Liquid chromatograph
  - i) Thermal analysis equipment
  - j) Scanning electro microscope
  - k) Others
  
- 2) Chemical engineering equipment
  - a) Distillation apparatus
  - b) Pumps
  - c) Fluid flow testing apparatus
  - d) Others
  
- 3) Measuring tools and instruments
  - a) Microscope
  - b) Thermo-meter
  - c) Wheatstone bridge
  - d) Pressure meter
  - e) Flow meter
  - f) Others
  
- 4) Drafting instruments
  - a) Drafting tool
  - b) Drafting table set
  - c) Others

- 5) Machines and Tools for metal works
  - a) Lathe
  - b) Welding machine and welding tool
  - c) Others
  
- 6) General experiment equipment
  - a) Dryer
  - b) Electric furnace
  - c) Constant Temperature bath
  - d) Stirrer Mixer
  - e) Grinder crusher
  - f) Vacuum experiment instrument
  - g) Centrifuge
  - h) Filter
  - i) Optical instrument
  - j) Glass equipment
  - h) Others
  
- 7) Low temperature experiment equipment
  
- 8) Electrical instrument and automatic control experimental equipment
  
- 9) Practical Training facility
  - a) Distillation equipment
  - b) Pumps
  - c) Water Treatment equipment
  - d) Others

## ANNEX VII

Items whose cost should be borne by the Government of the Republic of Indonesia

- 1). To acquire the land necessary for the Center including land survey, soil test and necessary land reclamation.
- 2). Electrical power supply as 380 voltage line to the site by installation of transformer.
- 3). To drill one deep well and install pump for supplying water to the high Elevated Water Reservoir provided by the Government of Japan.
- 4). One Telephone main line to the Center.
- 5). Fence Work as specified in ANNEX V.
- 6). Lawn and Planting.
- 7). 20 Units Staff Housings in the Site.
- 8). Dormitory and Dormitory Canteen as specified in ANNEX V.
- 9). Taking various necessary procedures in obtaining the permissions and exemptions of the custom duties and taxes from the respective authorities of the Government of the Republic of Indonesia for :
  - Japanese nationals concerned for the Project
  - Construction materials, equipment, construction machines, etc.
- 10). Securing expenses for providing services of the Indonesian Counterpart personnel necessary for the operation of the Center.
- 11). Providing all running expenses for the operation of the Center.

PROJECT SITE VIEW



SITE VIEW FROM THE EAST



SITE VIEW FROM THE EAST



TEST PIT



TEST PIT H = 2.0M SOIL CLAY



FRONT ROAD (JL Medan-Tanggara)



(SITE-RECLAMATION JUNE 8, 1980)



(FRONT VIEW OF THE SITE)



(BULL-DOZER AT THE SITE)



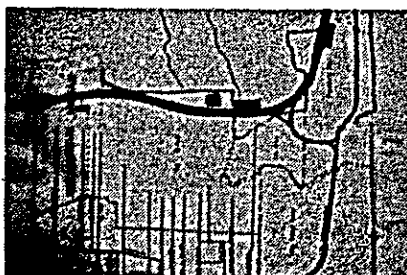
(DISCUSSION AT THE SITE)



(REMOVED RESIDENCES)



(U-DITCH WORK AT THE SITE)



(TOLLWAY PLAN)



(BENCH MARK OF THE PROJECTED TOLLWAY)