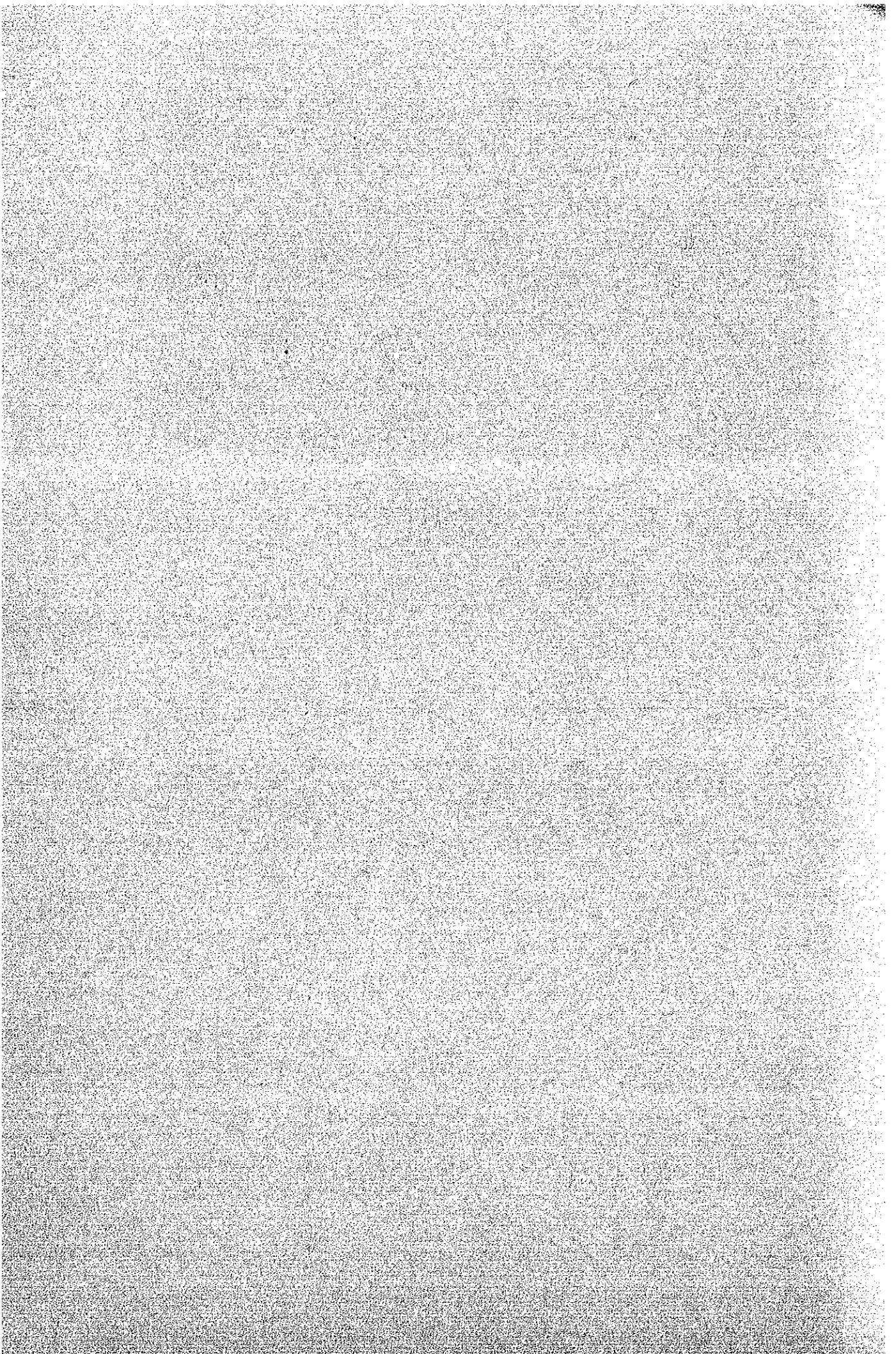


APPENDIX



## APPENDIX

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1. DESPATCH OF THE BASIC DESIGN STUDY TEAM

1-1 Member List of the Team

1) Basic Design Study Team (November 28 - December 19, 1985)

|                              |                         |   |
|------------------------------|-------------------------|---|
| Team Leader                  | Dr. Takayasu TAKIZAWA   | Director<br>First Research Division<br>National Institute of Animal<br>Health, Ministry of Agriculture,<br>Forestry and Fisheries |
| Grant Aid Policy             | Mr. Mitsuyuki YAMAMOTO  | Grand Aid Department<br>Economic Cooperation Bureau<br>Ministry of Foreign Affairs  |
| Project Coordinator          | Mr. Yoshihide TERANISHI | First Basic Design Study<br>Division, Grant Aid Planning<br>and Survey Department, Japan<br>International Cooperation<br>Agency   |
| Architectural Planner        | Mr. Yasuhiro MIYOSHI    | GKK Consultants, Inc  |
| Architectural Designer       | Mr. Masahiro IKAWA      | GKK Consultants, Inc.   |
| Facility Planner             | Mr. Yoshihisa KATO      | GKK Consultants, Inc.   |
| Research & Equipment Planner | Mr. Tatsuo KIKUNO       | GKK Consultants, Inc.   |

2) Explanation Team on Draft Final Report (March 27 - April 4, 1986)

|                              |                         |   |
|------------------------------|-------------------------|---|
| Team Leader                  | Dr. Hitoshi KAWAMURA    | Chief of Second Virology Laboratory, Second Research Division, National Institute of Animal Health, Ministry of Agriculture, Forestry and Fisheries |
| Project Coordinator          | Mr. Yoshihide TERANISHI | First Basic Design Study Division, Grant Aid Planning and Survey Department, Japan International Cooperation Agency                                 |
| Architectural Planner        | Mr. Yasuhiro MIYOSHI    | GKK Consultants, Inc.   |
| Architectural Designer       | Mr. Masahiro IKAWA      | GKK Consultants, Inc.   |
| Research & Equipment Planner | Mr. Tatsuo KIKUNO       | GKK Consultants, Inc.   |

1-2 Survey Schedule

1) Basic Design Study (November 28 - December 19, 1985)

| Date          | Activities  |
|---------------|---|
| Nov. 28 (Thu) | The study team arrived at Kuala Lumpur via JAL 721. Discussion held with Japanese Embassy and JICA Office as well as long-term surveyors.   |
| Nov. 29 (Fri) | The Team moved from Kuala Lumpur to Ipoh. Courtesy call on VRI. Discussion held with long-term surveyors and Preliminary Study Team for third country training programme.               |
| Nov. 30 (Sat) | Discussion with VRI. Discussion held with long-term surveyors and Preliminary Study Team for third country training programme.  |
| Dec. 01 (Sun) | VRI Facilities and equipment examined and planned construction site surveyed. Discussion held with long-term surveyors and Preliminary Study Team for third country training programme. |
| Dec. 02 (Mon) | Discussion with VRI. The Team moved from Ipoh to Kuala Lumpur. Discussion held with long-term surveyors and Preliminary Study Team for third country training programme.                |
| Dec. 03 (Tue) | Courtesy call on and discussion with the ASEAN Secretariat of the Ministry of Foreign Affairs. Discussion with DVS of the Ministry of Agriculture.                                      |
| Dec. 04 (Wed) | Discussion with DVS. The Team formulated the Draft Minutes and discussion with the Embassy and JICA Office.   |
| Dec. 05 (Thu) | Discussion on the Draft Minutes with DVS.   |
| Dec. 06 (Fri) | Final discussion on the Draft Minutes with DVS, EPU, ASEAN Secretariat, etc. Minutes signed.  |

| Date          | Activities   |
|---------------|--|
| Dec. 07 (Sat) | <p>Team Meeting, data assortment and study of construction situation.</p> <p>Courtesy call made on the Local Architectural Office (BEP AKITEK SDN).</p> <p>Survey made on the state of procuring research equipment.</p>   |
| Dec. 08 (Sun) | <p>Team Meeting.</p> <p>Assortment of collected data.</p>  |
| Dec. 09 (Mon) | <p>Team Meeting.</p> <p>Visit to the facilities (CIAST) established by Japan's Grant Aid.</p>  |
| Dec. 10 (Tue) | <p>Dr Takizawa, Team Leader, Mr Yamamoto and Mr Teranishi, members of the Team, left Malaysia.</p> <p>Visit to DVS and request for collection of necessary information.</p> <p>Visit to Public Works Department</p> <ul style="list-style-type: none"> <li>- Data obtained regarding the Biologics Unit to be built within the VRI campus.</li> <li>- Data obtained regarding unit prices of construction materials and labour expenses.</li> <li>- Meeting arranged with the State Director of the Public Works Department (Ipoh Branch).</li> </ul> <p>Visit to EPU</p> <ul style="list-style-type: none"> <li>- Government Building standard obtained.</li> </ul> |
| Dec. 11 (Wed) | <p>Visit to Local Architectural Office</p> <ul style="list-style-type: none"> <li>- Data about the local construction situation and building material unit prices obtained.</li> </ul> <p>Visit to MARDI</p> <ul style="list-style-type: none"> <li>- Inspection of its poultry farm, etc.</li> </ul>  |
| Dec. 12 (Thu) | <p>The Team moved from Kuala Lumpur to Ipoh</p> <p>Visit to Public Works Department (Ipoh Branch)</p> <ul style="list-style-type: none"> <li>- Layout plan of VRI obtained.</li> <li>- Submission of questionnaire about the infrastructure of VRI</li> </ul>  |



| Date          | Activities  |
|---------------|---|
| Dec. 13 (Fri) | <ul style="list-style-type: none"> <li>- Collection of information requested.</li> <li>Visit to Ipoh Municipal government.</li> <li>- Inquire about construction approval.</li> <li>- Electricity charges, etc. examined at LLN.</li> <li>Visit to VRI.</li> <li>- Discussion held concerning research equipment now in use and research programmes.</li> <li>Visit to National Electricity Board (Ipoh Branch)</li> <li>- Inquire about VRI electric power situation.</li> <li>Visit to Water Supply Department</li> <li>- Inquire about VRI water supply</li> <li>Visit to VRI</li> <li>- Discussion held concerning research equipment now in use and research programmes.</li> <li>- Planned construction site surveyed.</li> <li>Visit to Public Works Department (Ipoh Branch)</li> <li>Field inspection under construction.</li> <li>The Team moved from Ipoh to Butterworth.</li> </ul> |
| Dec. 14 (Sat) | <ul style="list-style-type: none"> <li>Visit to Bukit Tengah RVDL</li> <li>- Diagnostic activities and equipment examined.</li> <li>Visit to Poultry Multiplication Centre</li> <li>- Reference data for raising SPF obtained and examined.</li> </ul>  |
| Dec. 15 (Sun) | Assortment of collected data.   |
| Dec. 16 (Mon) | <ul style="list-style-type: none"> <li>Visit to JICA Office.</li> <li>Visit to The Ministry of Science, Technology and Environments.</li> <li>Visit to The Metrological Department.</li> <li>Visit to DVS</li> <li>- Written reply obtained</li> <li>- Discussion made on training programs (FAO/APHCA Training Program obtained)</li> </ul>  |

| Dates         | Activities   |
|---------------|--|
| Dec. 17 (Tue) | Visit to Quantity Surveyor's office<br>- Information about construction material unit prices and labour expenses obtained.   |
| Dec. 18 (Wed) | Visit to JICA Office<br>- Report made on the study outline.<br>Visit to Japanese Embassy<br>- Completion of study reported.<br>Visit to Public Works Department<br>- Data obtained about the Biologic Unit to be constructed within VRI campus in Ipoh.<br>The Team left Malaysia. |
| Dec. 19 (Thu) | The Team arrived at Tokyo.   |

2) Explanation on Draft Final Report (March 27 - April 4, 1986)

| Date          | Activities  |
|---------------|---|
| Mar. 27 (Thu) | The Team arrived at Kuala Lumpur via JAL 721.<br>Team Meeting   |
| Mar. 28 (Fri) | Discussion with JICA Office.<br>Visit to DVS<br>- Explanation and discussion of Draft Final Report (DFR)                  |
| Mar. 29 (Sat) | Courtesy call on The Embassy of Japan<br>Courtesy call and discussion with ASEAN Secretariat Ministry of Foreign Affairs. |
| Mar. 30 (Sun) | The Team moved from Kuala Lumpur to Ipoh.   |
| Mar. 31 (Mon) | Visit to VRI<br>- Explanation and discussion of DFR, Field survey<br>The Team moved from Ipoh to Kuala Lumpur             |
| Apr. 01 (Tue) | Discussion with DVS   |
| Apr. 02 (Wed) | Discussion on the Draft Minutes with DVS<br>Visit to EPU (Technical Services Division)                                    |
| Apr. 03 (Thu) | - Explanation and discussion of Architectural plan<br>The Minutes signed.<br>The Team left Malaysia.                      |
| Apr. 04 (Fri) | The Team arrived at Tokyo.  |

## 1-3 List of Counterparts

| NAME  | POSITION                                  |
|---|---|
| <u>DVS of the Ministry of Agriculture</u>                       |   |
| Dr. Ahmad Mustaffa bin Haji Babjee                              | Director-General                          |
| Dr. Nik Mahmood bin Nik Mohamed                                 | Deputy Director-General                   |
| Dato (Dr.) Kardin bin Haji Shukor                               | Asst. Director-General                    |
| Dr. Anwor Hassan  | Director of Planning                      |
| Dr. Heng Ngak Hawe  | Senior Veterinary Officer                 |
| Mr. Yaha bin Muhamad  | Research Officer                          |
| <u>Department of International,<br/>Ministry of Agriculture</u> |   |
| Mr. Kamaruddin bin Sallah                                       | Principal Asst. Secretary                 |
| Mr. Ab. Ghaffar A. Tambi  | Asst. Secretary, ASEAN Affairs            |
| <u>VRI</u>  |   |
| Dr. Abdul Rahman bin Mahd. Sallah                               | Director                                  |
| Dr. Gan Chee Hiong  | Veterinary Officer                        |
| Mr. Christopher Kajamanickam                                    | Head, Parasitology Section                |
| Mr. Lo Hann Seang   | Head, Viral, Vaccines Section             |
| Mr. Lim Kean Teik   | Head, Avian Virology Section              |
| Dr. Nor Aidah binti A. Rahim                                    | Head, Bacteriology/Mycology<br>Section    |
| Mr. D. Loganath   | Head, Pathology Section                   |
| <u>Bukit Tengah RVDL</u>  |   |
| Dr. Chai Kim Kheong   | Veterinary Officer                        |
| <u>Veterinary Diagnostic Laboratory</u>                         |   |
| Dr. T. Supra Maniam   | Director                                  |
| <u>Economic Planning Unit</u>                                   |   |
| Mr. Shaharuddin bin Mahd. Sam                                   | Asst. Director, External Asst.<br>Section |
| Mr. Ho Kee Chai<br>(Technical Services Division)                | Deputy Director                           |
| <u>ASEAN Secretariat, Ministry of<br/>Foreign Affairs</u>       |   |
| Mr. Sallehuddin   | Deputy Director-General                   |
| Mr. Sopian bin Haji Ahmad                                       | Principal Asst. Secretary                 |
| Mr. Hussein   | Asst. Secretary                           |

| N A M E  | P O S I T I O N   |
|--|---|
| <u>Public Works Department</u><br>Mr. Dzulkifli<br>Mr. Tony Sanphanam<br>Miss Laili Mazni Yahya<br>Mr. Lim Cho Boon<br>Miss Lee Bee Choo<br>Miss Azizah Salim<br>Mr. Zakarian bin Omar<br><br><u>IPOH City</u><br>Mr. Kong Siew Hong<br>Mr. Karthigesu | Architect<br>Senior Technician<br>Quantity Surveyor<br>IPOH - State Director<br>IPOH - Senior Architect<br>Architect<br>IPOH - Electricity Chief<br>Engineer<br><br><br>Director, Engineering Department<br>Engineer, Water Supply Department |

1-4 Minutes of Discussions

1) At time of the Basic Design Study

MINUTES OF DISCUSSION ON  
THE PROJECT OF THE ASEAN POULTRY DISEASE RESEARCH  
AND TRAINING CENTRE

KUALA LUMPUR, MALAYSIA

6TH DECEMBER, 1985

MINUTES OF DISCUSSIONS

ON

THE PROJECT OF THE ASEAN POULTRY DISEASE RESEARCH AND TRAINING CENTRE

IN

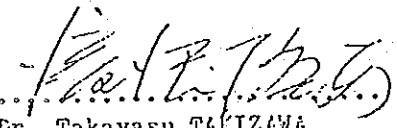
MALAYSIA

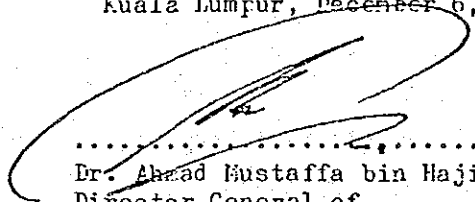
In response to the request made by the Government of Malaysia for a grant aid on the Project of The ASEAN Poultry Disease Research and Training Centre in Malaysia (hereinafter referred to as "the Project"), the Government of Japan has decided to conduct a basic design study on the Project. The Japan International Cooperation Agency which is an official agency implementing the international cooperation programmes of the Government of Japan (hereinafter referred to as "JICA") has sent a basic design study team headed by Dr. Takayasu TAKIZAWA, Director, First Research Division, National Institute of Animal Health, Ministry of Agriculture, Forestry and Fisheries, to Malaysia (hereinafter referred to as "the Study Team") from 28th November to 19th December, 1985.

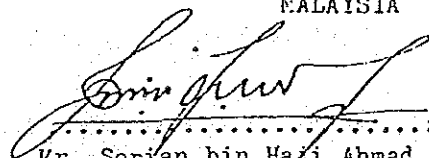
The Study Team had carried out a field survey, held a series of discussions and exchanged views with the relevant authorities of the Government of Malaysia.

Both parties have agreed to recommend to their respective Governments to examine the results of the study and discussions attached herewith towards the realization of the Project.

Kuala Lumpur, December 6, 1985.

  
.....  
Dr. Takayasu TAKIZAWA  
Leader of  
The Basic Design Study Team  
JICA

  
.....  
Dr. Ahmad Mustafa bin Haji Babjee  
Director-General of  
Department of Veterinary Services  
Ministry of Agriculture  
MALAYSIA

  
.....  
Mr. Sopian bin Haji Ahmad  
Witness  
ASEAN-Malaysia  
ASEAN Secretariat  
Ministry of Foreign Affairs  
MALAYSIA.

## ATTACHMENT

1. The objective of the Project is to establish the ASEAN Poultry Disease Research and Training Centre (hereinafter referred to as "the Centre") for the purpose of upgrading the level of research in poultry diseases, diffusing the research results and technologies to other ASEAN countries through training and thus contributing to the manpower development in poultry disease research in ASEAN.
2. The implementing agency of the Project is the Department of Veterinary Services, Ministry of Agriculture in collaboration with the Coordinating Group on Livestock of the ASEAN-COFRAP. The relationship among the agencies concerned for implementing the Project as shown in ANNEX I.
3. The proposed sites of the Centre are to be located in the campus of the Veterinary Research Institute, Ipoh, State of Perak. The site plan is attached as ANNEX II.
4. The Centre will implement research and training activities on poultry diseases.
  - 4.1. Research activities on poultry diseases are to be carried out in the following fields:
    - a) Virology
    - b) Bacteriology
    - c) Parasitology
    - d) Pathology

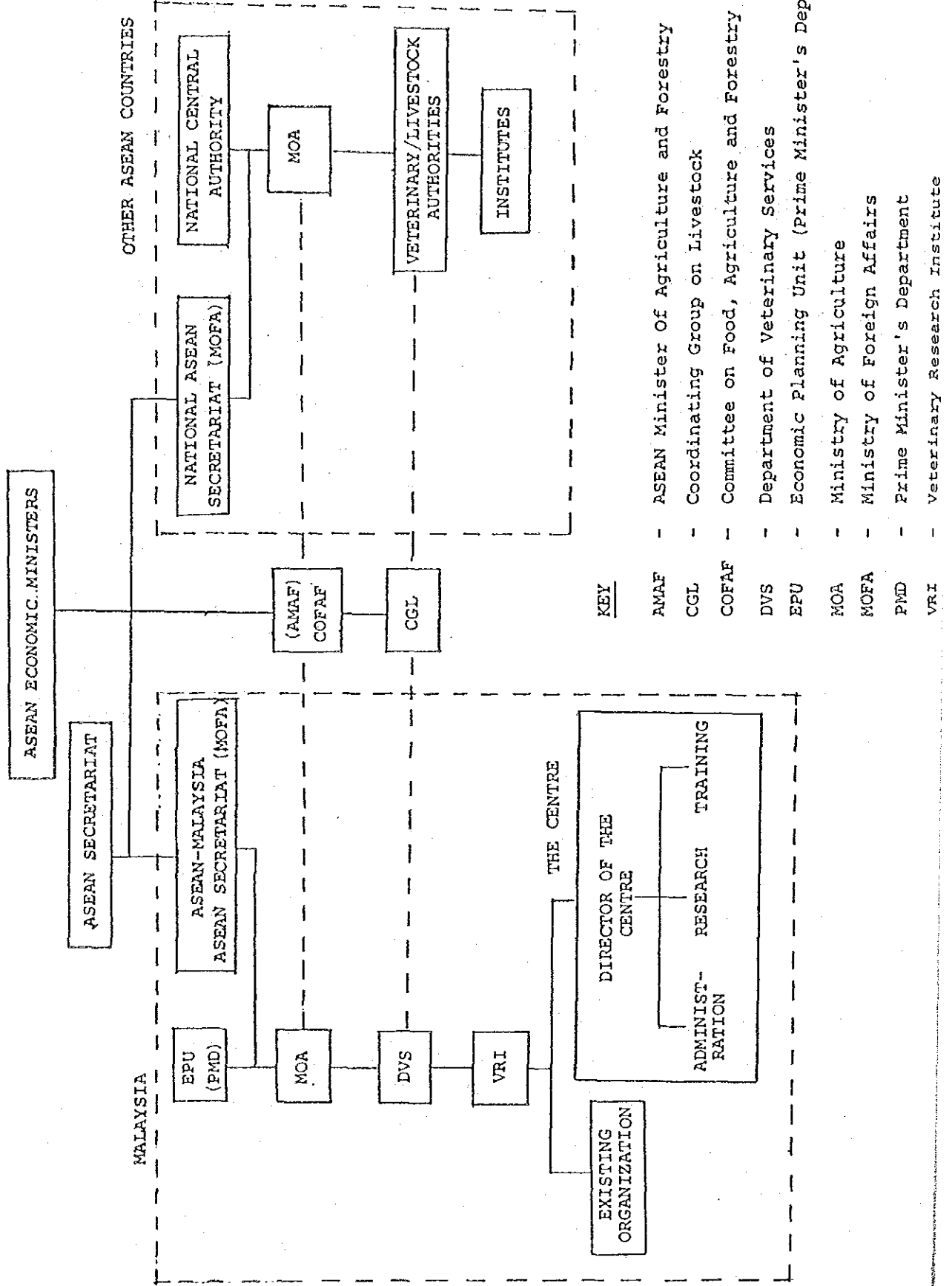
Themes of research to be studied at the first stage of the Project in each field will be as ANNEX III
  - 4.2 Training courses to be conducted for ASEAN countries are as follows:-



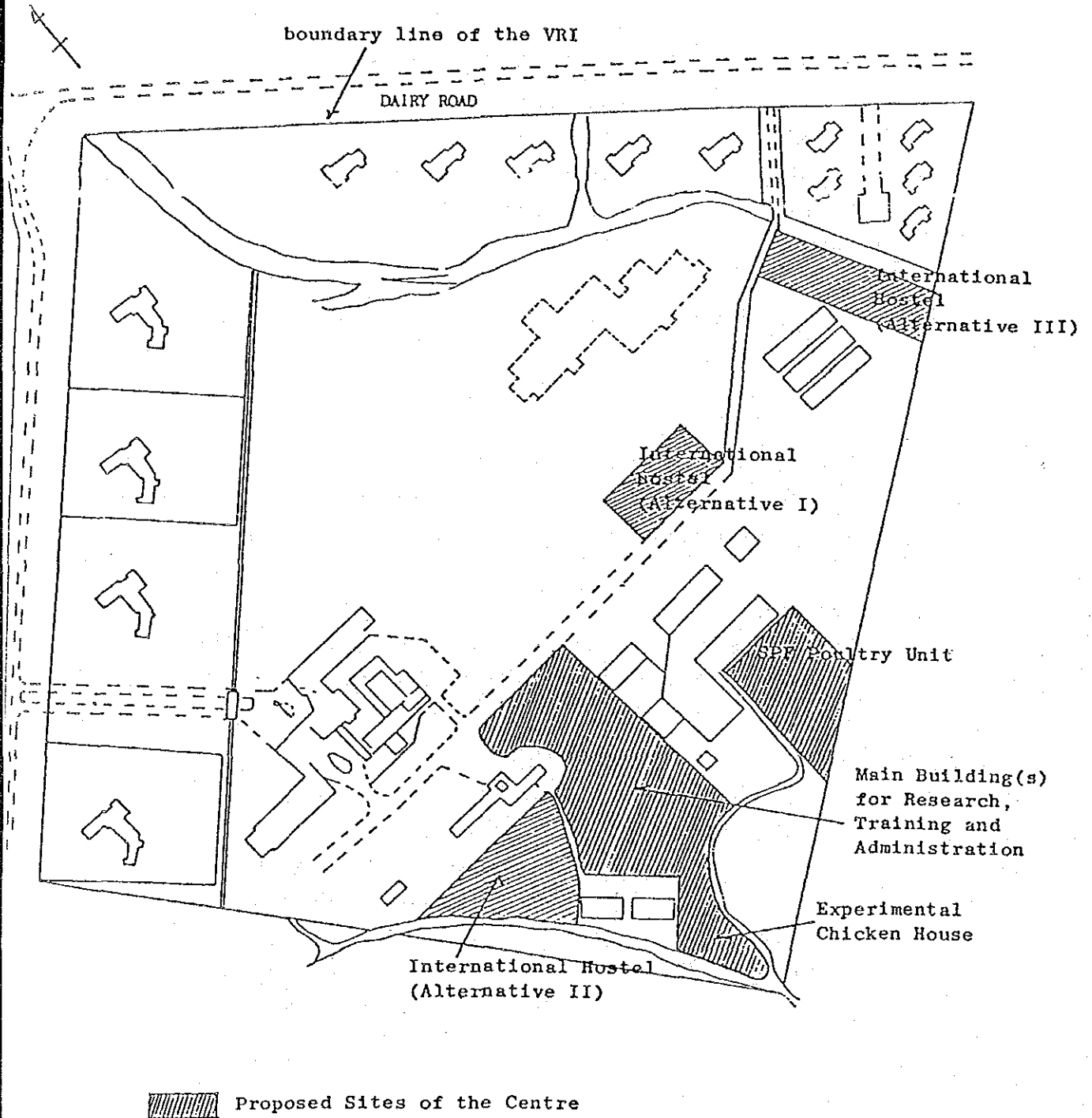
- a) ASEAN Seminar on Poultry Diseases.
  - b) ASEAN Course on Basic Diagnostic Techniques of Poultry Diseases.
  - c) ASEAN Course on Specialized Diagnostic and Research Techniques on Poultry Diseases.
5. The Study Team will convey to the Government of Japan the desire of the Government of Malaysia that the former takes necessary measures to cooperate in implementing the Project and bears the cost of the facilities and equipment requested by the latter as ANNEX IV within the scope of Japanese economic cooperation in grant form.
6. The Government of Malaysia will take necessary measures as ANNEX V upon the execution of the grant aid to the Project by the Government of Japan.

RELATIONSHIP AMONG AGENCIES CONCERNED FOR IMPLEMENTING THE PROJECT  
OF THE ASEAN POULTRY DISEASE RESEARCH AND TRAINING CENTRE

ANNEX I



SITE PLAN OF THE CENTRE



Themes of research to be studied at the first stage of the Project will be as follows:-

1. Virology

- \*\* Formulation of Oil Emulsion and Inactivation of Newcastle Disease Virus
- \*\* Development of Diagnostic Method of Avian Leukosis and Marek's Disease
- \*\* Technical Development of Hyperimmunization, Conjugation and Fluorescent Antibody Test
- \* Serological Typing of Infectious Bronchitis Virus
- \* Serological Test of Avian Influenza Virus and Paramyxoviruses
- \* Methods for Differentiation of Fowl Pox Virus

2. Bacteriology

- \*\* Etiological Studies on Chronic Respiratory Diseases
- \*\* Studies on Enteritis
- \*\* Etiological Studies on Feed Contamination

3. Parasitology

- \*\* Treatment, Control and Immunological Studies on Coccidiosis
- \* Vectors of Avian Diseases

4. Pathology

- \*\* Pathological Studies on Newcastle Disease, Avian Leukosis, Marek's Disease and Other Avian Diseases

Remarks: \*\* Higher priority  
\* Lower priority

Items requested by the Government of Malaysia are as follows:-

1. Facilities

1.1 Main building(s) for research, training and administration

- a) Virology research laboratory
- b) Bacteriology research laboratory
- c) Parasitology research laboratory
- d) Pathology research laboratory
- e) Common equipment and apparatus rooms
- f) Washing and sterilizing room
- g) Electron Microscope room
- h) Data processing room
- i) Lecture room
- j) Training room
- k) Poultry inspection room
- l) Administration office
- r) Conference room
- n) Other necessary facilities

1.2 Experimental chicken house

1.3 Specific pathogen free (SPF) poultry unit

1.4 International hostel inclusive of apartments for visiting ASEAN scientists

2. Equipment

2.1 Equipment for research

- a) Tissue culture equipment
- b) Fluorescent antibody test equipment
- c) ELISA System
- d) Equipment for preparation of media
- e) Microscope and accessories
- f) Fractionating columns
- g) Laminar flow
- h) Insectarium
- i) Autopsy equipment

- j) Cryostat
- k) Equipment for staining procedures
- l) Equipment for pathological inspection
- m) Refrigerator/freezer/ultra deep freezer
- n) Centrifuge
- o) Liquid nitrogen container
- p) Freeze drying apparatus
- q) Constant temperature incubator
- r) Washing and sterilizing equipment
- s) Electron Microscope and accessories
- t) Data processing equipment
- u) Other necessary equipment

## 2.2 Equipment for Training

- a) Microscope, dissection microscope and accessories
- b) Centrifuge
- c) Refrigerator
- d) CO<sub>2</sub> incubator
- e) Egg incubator
- f) Incubator for bacteria culture
- g) Audio-visual education aid
- h) Other necessary equipment

Major undertakings to be carried out by the Government of Malaysia

1. To clear, level and reclaim the sites when needed.
2. To construct the gate fence in and around the sites when needed.
3. To move the existing goat shed.
4. To construct the necessary roads leading to the sites.
5. To provide facilities for electricity, water supply, drainage and others.

5.1 Electricity

The distributing line to the sites.

5.2 Water supply

The city water distribution main to the sites.

5.3 Drainage

The drainage city main (for storm, sewer and others) to the sites.

5.4 Gas supply

The gas cylinders for LPG.

5.5 Telephone system

The telephone trunk line to the main distribution panel of the buildings.

5.6 Furnitures and equipment

General furnitures (carpet, curtain, table, chair and others)

6. To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement

6.1 Advising commission of Authorization to Pay

6.2 Payment commission

7. To ensure unloading, customs clearance and tax exemption of materials and equipment related to the Project at the port of disembarkation in Malaysia.
8. 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 Malaysia and stay therein for the performance of their work.
9. To maintain and use properly and effectively that facilities constructed and equipment purchased under the grant aid.
10. To bear all the expenses other than those to be borne by the grant aid, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.



2) At time of the Explanation of the Draft Final Report

MINUTES OF DISCUSSION ON  
THE PROJECT OF THE ASEAN POULTRY DISEASE  
RESEARCH AND TRAINING CENTRE

KUALA LUMPUR, MALAYSIA

3RD. APRIL, 1986

MINUTES OF DISCUSSIONS  
ON  
THE PROJECT OF THE ASEAN POULTRY DISEASE RESEARCH AND TRAINING CENTRE  
IN  
MALAYSIA


In response to the request made by the Government of Malaysia for a grant aid for the Project of the ASEAN Poultry Disease Research and Training Centre in Malaysia (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Malaysia the team headed by Dr. Takayasu TAKIZAWA, Director, First Research Division, National Institute of Animal Health, Ministry of Agriculture, Forestry and Fisheries, from 28th November to 19th December, 1985.

As a result of the study, JICA prepared a Draft Report and despatched a team headed by Dr. Hitoshi KAWAMURA, Chief of Second Virology Laboratory, Second Research Division, National Institute of Animal Health, Ministry of Agriculture, Forestry and Fisheries to explain and discuss it with the relevant authorities of the Government of Malaysia from 27th March to 4th April, 1986.

Both parties had a series of discussions on the Report and agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

3rd April, 1986.

111 打 育  
.....  
Dr. Hitoshi KAWAMURA  
Leader of  
The Basic Design Study Team  
JICA

  
.....  
Dr. Nik Mahmood bin Nik Mohamed  
Deputy Director-General of  
Department of Veterinary Services  
Ministry of Agriculture  
MALAYSIA

ATTACHMENT

1. The Malaysian side agreed in principle to the basic design in the Draft Final Report and appropriate amendments as shown in ANNEX I will be incorporated in the Final Report.
  
2. The Government of Malaysia will take necessary measures inclusive of preparation of budget for development and operating cost upon the execution of the grant aid to the Project by the Government of Japan.
  
3. The Final Report (17 copies in English) will be submitted to the Government of Malaysia in May 1986.

ANNEX I

1. The layout and siting of International Hostel shall be reconsidered in relation to the existing chicken house.
2. The auxiliary power source shall be considered for the Ultra Deep Freezer.
3. The telephone and inter-communication system shall be installed as follows:

|  |    |
|--|----|
| Research and Training Building   | 22 |
| International Hostel   | 30 |
| Twenty nine of 30 are available only<br>for inter-communication system |    |
| SFF Poultry Unit   | 8  |
| Seven of 8 are available only for<br>inter-communication system        |    |
| Experimental Chicken House   | 8  |
| Seven of 8 are available only for<br>inter-communication system.       |    |

4. Other appropriate amendments shall be incorporated in the Final Report.

## 2. OUTLINE OF EXISTING RESEARCH FACILITIES

### 2.1 Malaysia Agriculture Research Development Institution (MARDI)

Located about 40 km to the south of Kuala Lumpur, this institute is adjacent to the Malaysian Agricultural College. Taking the form of an all-round agricultural test ground, the institute conducts raising tests concerning rearing environments and feeds for pigs and poultry (brown egg chickens, broilers and ducks) in its livestock sector and also engages in technical guidance to farm households on the basis of its research results.

Chicken houses comprise of a fledgling unit and three full-grown chicken units, with laying hens are grown in cages and broilers on the ground. The average egg-laying rate of the laying hens stand at 70 - 80 per cent, with the first egg being laid when they are 150 days old. Broilers are shipped out at 56 days old with their weight at 2.3 kg and rate of feeding at 2.3-2.5.

### 2.2 Bukit Tengah Provincial Wellesly

Situated in the suburbs of Butterworth, a northern city in Malaysia, is a poultry farm test ground designed to train poultry farming engineers, provide extension services and supply high quality fledgings. This Centre has four old chicken houses (each designed to accomodate 2,000 chickens) and four new chicken houses (2,100 chickens each). Sufficient distance is maintained between these chicken houses, each of which adopts the all in all out formula. Fledging production is 1,200 million per year with emphasis placed on hygiene, and its process ranging from the taking of seed eggs and their storage to hatchings and shipment of fledgings and management of facilities not inferior to that of livestock breeding farms in Japan.

In some of its chicken houses, the Centre raises White Leghorns, which belong to the Ross Class of U.K. Their seed eggs are delivered as hatching eggs (hatching in 5-6 days) to VRI, where

their first fledglings are also sent from time to time. Eight hundred quail are also being raised (in separate cages).

### 2-3 Veterinary Diagnostic Laboratory

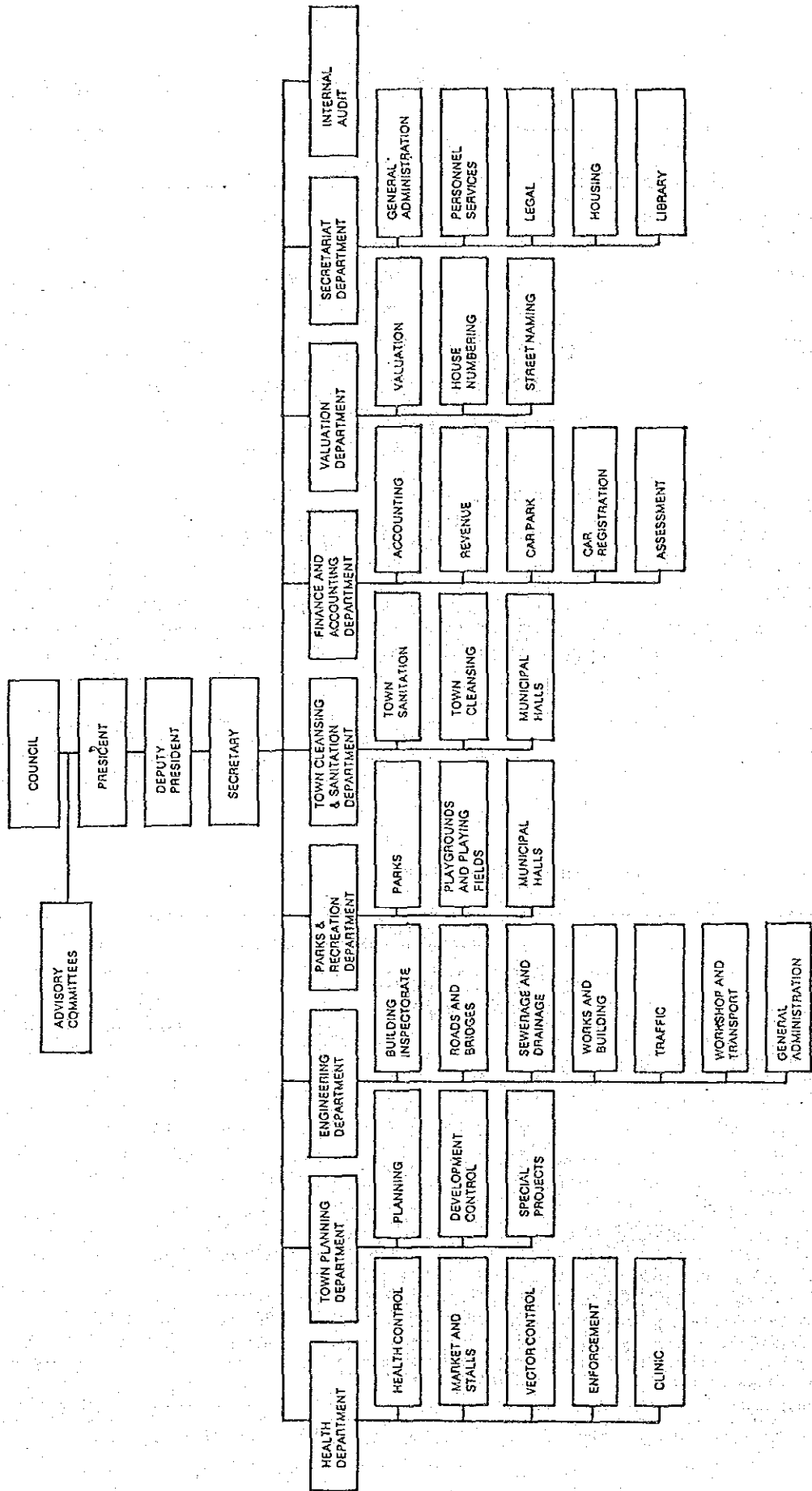
The MDV is located in a corner of the Poultry Multiplication Centre. It consists of an administration building and laboratory building, where three veterinarians are posted.

It has four sectors, virology, bacteriology, paraitology and pathology, but there seems to be little work to be done.

Covering the northern part of Malaysia, it chiefly engages in the assessment of the nature of diseases in cattle, pigs, poultry, range horses, dogs and cats, with cases unable to be diagnosed sent to the VRI.

3. DATA (Source : Ipoh Structural Plan)

3-1 Overall Function Chart of Majlis Perbandaran, IPOH



### 3-2 Population Growth

| Administrative District | Population       |                  |                  |                  |                  | Rate Of Growth |
|-------------------------|------------------|------------------|------------------|------------------|------------------|----------------|
|                         | 1980             | 1985             | 1990             | 1995             | 2000             |                |
| Batang Padang           | 136,586          | 144,980          | 153,890          | 163,348          | 173,386          | 1.2            |
| Dinding                 | 146,049          | 155,792          | 166,185          | 177,272          | 189,098          | 1.3            |
| Hilir Perak             | 205,819          | 219,550          | 234,196          | 249,820          | 266,486          | 1.3            |
| Kinta                   | 573,530          | 623,966          | 678,837          | 738,534          | 803,480          | 1.7            |
| Krian                   | 157,649          | 160,028          | 162,443          | 164,894          | 167,382          | 0.3            |
| Kuala Kangsar           | 144,488          | 145,939          | 147,404          | 148,884          | 150,379          | 0.2            |
| Larut & Matang          | 253,707          | 271,971          | 291,549          | 312,537          | 335,036          | 1.4            |
| Perak Tengah            | 74,067           | 77,460           | 81,010           | 84,721           | 88,603           | 0.9            |
| Hulu Perak              | 70,383           | 74,709           | 79,299           | 84,174           | 89,347           | 1.2            |
| <b>Total:-</b>          | <b>1 762 278</b> | <b>1 874 395</b> | <b>1 994 813</b> | <b>2 124 184</b> | <b>2 263 197</b> | <b>1.2</b>     |

Source: ISPU - Technical Report 'Regional Population

### 3-3 Gross Product and Annual Real Growth Rate

|   | Perak                            |              |                 |                     |            | Peninsular Malaysia                 |               |                 |                     |            |
|---|----------------------------------|--------------|-----------------|---------------------|------------|-------------------------------------|---------------|-----------------|---------------------|------------|
|   | Gross State Product (million \$) |              | Growth Rate (%) | Rank of Growth Rate | Trend      | Gross Domestic Product (million \$) |               | Growth Rate (%) | Rank of Growth Rate | Trend      |
|   | 1970                             | 1980         |                 |                     |            | 1970                                | 1980          |                 |                     |            |
| Agriculture, Forestry and Fishing                     | 486                              | 682          | 3.45            | 7                   | Increasing | 2 708                               | 4 485         | 5.17            | 8                   | Increasing |
| Mining and Quarrying                                  | 302                              | 280          | -0.75           | 9                   | Decreasing | 581                                 | 653           | 1.18            | 9                   | Increasing |
| Manufacturing   | 142                              | 511          | 13.66           | 2                   | Increasing | 1 207                               | 5 159         | 15.63           | 1                   | Increasing |
| Construction  | 40                               | 102          | 9.81            | 3                   | Increasing | 387                                 | 961           | 9.52            | 5                   | Increasing |
| Utilities   | 59                               | 80           | 3.09            | 8                   | Increasing | 224                                 | 539           | 9.18            | 6                   | Increasing |
| Transport, storage and Communication                  | 66                               | 135          | 7.42            | 5                   | Increasing | 514                                 | 1 499         | 11.30           | 3                   | Increasing |
| Wholesale and Retail Trade, Hotels and Restaurants    | 188                              | 370          | 7.01            | 6                   | Increasing | 1 228                               | 2 916         | 9.03            | 7                   | Increasing |
| Finance, Insurance, Real Estate and Business Services | 114                              | 265          | 8.80            | 4                   | Increasing | 712                                 | 1 907         | 10.35           | 4                   | Increasing |
| Government services                                   | 83                               | 380          | 16.43           | 1                   | Increasing | 709                                 | 2 990         | 15.48           | 2                   | Increasing |
| Other services  | 118                              | 77           | -4.18           | 10                  | Decreasing | 711                                 | 597           | -1.73           | 10                  | Decreasing |
| <b>Gross State Product</b>                            | <b>1 598</b>                     | <b>2 862</b> | <b>6.07</b>     |                     |            |                                     |               |                 |                     |            |
| <b>Gross Domestic Product</b>                         |                                  |              |                 |                     | Increasing | <b>8 981</b>                        | <b>21 706</b> | <b>9.22</b>     |                     | Increasing |

Source: Fourth Malaysia Plan.



3-4 Metrological Data at IPOH (Source : Malaysian Metrological Service)

TEMPERATURE (°C)

Year : 1983

| Hour<br>Month | Mean Hourly |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Mean<br>Daily | Mean<br>Max. | Mean<br>Min. |
|---------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------------|--------------|--------------|
|               | 1           | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   | 24   |               |              |              |
| January       | 24.7        | 24.3 | 24.0 | 23.6 | 23.4 | 23.1 | 23.0 | 24.4 | 26.6 | 28.4 | 30.4 | 31.7 | 32.4 | 32.5 | 32.6 | 32.0 | 30.8 | 29.1 | 27.7 | 26.9 | 26.4 | 26.0 | 25.6 | 25.1 | 27.3          | 33.5         | 22.7         |
| February      | 25.6        | 25.3 | 24.9 | 24.5 | 24.3 | 24.0 | 23.9 | 25.1 | 27.5 | 29.5 | 31.4 | 32.9 | 33.8 | 34.3 | 34.3 | 33.1 | 31.1 | 29.7 | 28.1 | 27.3 | 26.8 | 26.4 | 26.2 | 26.0 | 28.2          | 35.1         | 23.7         |
| March         | 25.7        | 25.5 | 25.3 | 25.0 | 24.8 | 24.5 | 24.5 | 25.9 | 27.8 | 29.8 | 31.5 | 32.9 | 33.8 | 34.0 | 33.5 | 32.7 | 30.7 | 29.1 | 27.7 | 27.2 | 26.9 | 26.7 | 26.4 | 26.1 | 28.3          | 34.8         | 24.3         |
| April         | 26.4        | 26.1 | 25.9 | 25.6 | 25.4 | 25.2 | 25.2 | 26.5 | 28.5 | 30.3 | 32.1 | 33.3 | 33.9 | 34.4 | 34.0 | 33.0 | 31.2 | 29.5 | 28.6 | 27.9 | 27.4 | 27.2 | 26.9 | 26.6 | 28.8          | 34.8         | 24.9         |
| May           | 25.9        | 25.7 | 25.5 | 25.3 | 25.1 | 24.9 | 25.0 | 26.4 | 28.2 | 29.9 | 31.5 | 32.5 | 32.9 | 32.7 | 31.7 | 31.2 | 30.5 | 29.3 | 28.2 | 27.6 | 27.2 | 26.9 | 26.6 | 26.3 | 28.2          | 33.8         | 24.5         |
| June          | 25.7        | 25.4 | 25.1 | 24.8 | 24.6 | 24.5 | 24.6 | 26.0 | 27.9 | 29.9 | 31.4 | 32.3 | 33.0 | 33.3 | 33.1 | 32.3 | 30.9 | 29.1 | 28.0 | 27.4 | 27.0 | 26.6 | 26.3 | 25.9 | 28.1          | 33.9         | 24.1         |
| July          | 25.1        | 24.8 | 24.5 | 24.3 | 24.1 | 24.0 | 24.2 | 25.5 | 27.3 | 29.0 | 30.7 | 31.8 | 32.6 | 32.5 | 32.2 | 31.5 | 30.5 | 29.2 | 27.9 | 27.1 | 26.6 | 26.2 | 25.8 | 25.5 | 27.6          | 33.5         | 23.8         |
| August        | 24.9        | 24.7 | 24.4 | 24.2 | 24.1 | 23.9 | 24.0 | 25.3 | 27.1 | 28.7 | 30.1 | 30.9 | 31.6 | 31.6 | 31.6 | 31.1 | 29.9 | 28.5 | 27.3 | 26.5 | 26.0 | 25.7 | 25.3 | 25.1 | 27.2          | 32.9         | 23.7         |
| September     | 24.4        | 24.1 | 23.9 | 23.8 | 23.6 | 23.5 | 23.5 | 24.9 | 26.5 | 28.2 | 29.8 | 31.1 | 31.5 | 31.3 | 30.8 | 29.6 | 28.9 | 27.8 | 26.7 | 26.0 | 25.5 | 25.2 | 24.8 | 24.5 | 26.7          | 32.3         | 23.1         |
| October       | 24.7        | 24.5 | 24.2 | 24.0 | 23.8 | 23.7 | 23.9 | 25.3 | 27.3 | 29.1 | 30.6 | 31.7 | 32.1 | 31.4 | 30.8 | 30.0 | 29.1 | 27.9 | 26.9 | 26.4 | 26.0 | 25.6 | 25.3 | 25.0 | 27.1          | 32.8         | 23.5         |
| November      | 24.5        | 24.3 | 24.1 | 23.9 | 23.7 | 23.6 | 23.7 | 25.2 | 27.2 | 29.2 | 30.6 | 31.6 | 32.1 | 31.9 | 31.3 | 30.7 | 29.1 | 27.7 | 26.8 | 26.0 | 25.5 | 25.2 | 24.9 | 24.6 | 27.0          | 32.8         | 23.4         |
| December      | 24.0        | 23.8 | 23.6 | 23.4 | 23.2 | 23.1 | 23.1 | 24.1 | 25.5 | 27.1 | 28.4 | 29.7 | 30.3 | 30.7 | 30.2 | 28.7 | 27.4 | 26.2 | 25.6 | 25.1 | 24.9 | 24.6 | 24.4 | 24.2 | 25.9          | 31.2         | 22.9         |
| Mean          | 25.1        | 24.9 | 24.6 | 24.4 | 24.2 | 24.0 | 24.1 | 25.4 | 27.3 | 29.1 | 30.7 | 31.9 | 32.5 | 32.5 | 32.2 | 31.3 | 30.0 | 28.6 | 27.5 | 26.8 | 26.3 | 26.0 | 25.7 | 25.4 | 27.5          | 33.5         | 23.7         |

RELATIVE HUMIDITY (%)

| Hour<br>Month | Mean Hourly |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    | Mean<br>Daily | Mean<br>Max. | Mean<br>Min. |
|---------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---------------|--------------|--------------|
|               | 1           | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |               |              |              |
| January       | 91          | 91 | 91 | 91 | 90 | 90 | 91 | 85 | 73 | 68 | 61 | 56 | 53 | 54 | 54 | 57 | 63 | 72 | 80 | 84 | 87 | 89 | 90 | 91 | 77            | 95           | 50           |
| February      | 90          | 90 | 91 | 91 | 91 | 92 | 92 | 85 | 73 | 67 | 60 | 54 | 51 | 49 | 50 | 56 | 66 | 72 | 79 | 83 | 86 | 88 | 89 | 90 | 77            | 94           | 48           |
| March         | 91          | 92 | 92 | 93 | 93 | 94 | 93 | 87 | 77 | 70 | 63 | 59 | 56 | 55 | 57 | 61 | 69 | 77 | 83 | 85 | 87 | 89 | 90 | 90 | 79            | 95           | 52           |
| April         | 90          | 90 | 91 | 91 | 92 | 92 | 91 | 86 | 77 | 71 | 63 | 60 | 57 | 56 | 57 | 62 | 69 | 76 | 80 | 83 | 86 | 88 | 89 | 90 | 79            | 94           | 55           |
| May           | 93          | 93 | 93 | 94 | 94 | 94 | 94 | 87 | 79 | 72 | 67 | 62 | 61 | 61 | 65 | 68 | 71 | 78 | 83 | 86 | 87 | 90 | 91 | 92 | 81            | 95           | 57           |
| June          | 90          | 90 | 91 | 91 | 92 | 92 | 92 | 86 | 78 | 70 | 63 | 59 | 56 | 55 | 56 | 61 | 67 | 75 | 81 | 84 | 86 | 88 | 89 | 90 | 79            | 94           | 53           |
| July          | 91          | 91 | 92 | 92 | 93 | 93 | 93 | 86 | 78 | 71 | 64 | 59 | 56 | 56 | 58 | 61 | 65 | 71 | 79 | 83 | 85 | 88 | 89 | 90 | 79            | 95           | 53           |
| August        | 93          | 93 | 94 | 94 | 95 | 94 | 94 | 88 | 80 | 73 | 68 | 64 | 61 | 61 | 61 | 64 | 70 | 77 | 83 | 86 | 89 | 90 | 91 | 92 | 81            | 96           | 57           |
| September     | 93          | 94 | 94 | 94 | 94 | 95 | 95 | 89 | 81 | 73 | 67 | 63 | 60 | 62 | 65 | 70 | 74 | 78 | 84 | 88 | 90 | 91 | 92 | 93 | 82            | 96           | 57           |
| October       | 93          | 93 | 94 | 95 | 95 | 95 | 95 | 89 | 80 | 73 | 67 | 62 | 60 | 64 | 67 | 70 | 74 | 80 | 85 | 88 | 90 | 91 | 92 | 93 | 83            | 96           | 57           |
| November      | 92          | 92 | 92 | 92 | 93 | 93 | 92 | 87 | 78 | 71 | 63 | 60 | 58 | 60 | 63 | 64 | 71 | 78 | 83 | 87 | 88 | 89 | 91 | 92 | 80            | 95           | 55           |
| December      | 95          | 94 | 95 | 95 | 95 | 95 | 95 | 91 | 84 | 77 | 72 | 68 | 66 | 64 | 66 | 74 | 80 | 86 | 90 | 91 | 92 | 94 | 94 | 94 | 85            | 97           | 62           |
| Mean          | 92          | 92 | 93 | 93 | 93 | 93 | 93 | 87 | 78 | 71 | 65 | 61 | 58 | 58 | 60 | 64 | 70 | 77 | 83 | 86 | 88 | 89 | 91 | 91 | 80            | 95           | 55           |

### CLIMATOLOGICAL SUMMARY

Year : 1983

| Month                  | Mean M.S.L. Pressure at 0700 ST (mb.) | Absolute Extreme |         |                       | Mean Amount of Cloud (oktas) (0-8) |         |         | Rainfall (mm.) |                  |          | Number of Days       |             |             |             |             |                |          |          |          |            |       |      |         |     | Mean Daily Evaporation (mm.) |            |            |     |    |     |    |     |
|------------------------|---------------------------------------|------------------|---------|-----------------------|------------------------------------|---------|---------|----------------|------------------|----------|----------------------|-------------|-------------|-------------|-------------|----------------|----------|----------|----------|------------|-------|------|---------|-----|------------------------------|------------|------------|-----|----|-----|----|-----|
|                        |                                       | Temperature (°C) |         | Relative Humidity (%) | 0700 ST                            | 1300 ST | 1500 ST | Total          | Highest in a day | Days     | Air Temperature (°C) |             |             |             |             | Rainfall (mm.) |          |          |          | Wind Force |       | Hail | Thunder | Fog |                              | † Overcast | † Blue Sky |     |    |     |    |     |
|                        |                                       | High-est         | Low-est |                       |                                    |         |         |                |                  |          | Max. ≥ 34.5          | Max. < 34.4 | Max. ≤ 28.4 | Min. < 21.5 | Min. ≥ 21.6 | R ≥ 0.1        | R ≥ 12.5 | R ≥ 25.0 | R ≥ 50.0 | F ≥ 6      | F ≥ 8 |      |         |     |                              |            |            |     |    |     |    |     |
|                        |                                       | Max.             | Min.    | Max.                  | Min.                               | Max.    | Min.    | R ≥ 0.1        | R ≥ 12.5         | R ≥ 25.0 | R ≥ 50.0             | F ≥ 6       | F ≥ 8       |             |             |                |          |          |          |            |       |      |         |     |                              |            |            |     |    |     |    |     |
| January                | 1012.9                                | 35.8             | 21.0    | 38                    | 6                                  | 6       | 6       | 52.0           | 38.7             | 26       | 7                    | 24          | ..          | 2           | 29          | 6              | 1        | 1        | ..       | 3          | ..    | ..   | 5       | ..  | 16                           | ..         | 4.5        |     |    |     |    |     |
| February               | 12.2                                  | 36.1             | 21.9    | 31                    | 6                                  | 5       | 6       | 105.0          | 28.5             | 14       | 22                   | 6           | ..          | ..          | 28          | 10             | 3        | 1        | ..       | 11         | ..    | ..   | 13      | ..  | 11                           | ..         | 5.3        |     |    |     |    |     |
| March                  | 11.8                                  | 35.9             | 22.0    | 35                    | 6                                  | 6       | 7       | 163.5          | 33.7             | 28       | 24                   | 7           | ..          | ..          | 31          | 15             | 5        | 2        | ..       | 12         | ..    | ..   | 16      | ..  | 26                           | ..         | 5.3        |     |    |     |    |     |
| April                  | 10.3                                  | 36.1             | 23.2    | 43                    | 7                                  | 7       | 7       | 184.0          | 53.8             | 28       | 23                   | 7           | ..          | ..          | 30          | 8              | 5        | 4        | 1        | 5          | 1     | ..   | 12      | ..  | 27                           | ..         | 4.9        |     |    |     |    |     |
| May                    | 10.1                                  | 35.5             | 22.7    | 45                    | 7                                  | 7       | 7       | 93.8           | 23.9             | 2        | 10                   | 21          | ..          | ..          | 31          | 19             | 3        | ..       | ..       | 7          | ..    | ..   | 22      | ..  | 27                           | ..         | 4.3        |     |    |     |    |     |
| June                   | 10.3                                  | 35.7             | 22.5    | 42                    | 7                                  | 6       | 7       | 186.9          | 89.0             | 11       | 7                    | 23          | ..          | ..          | 30          | 11             | 3        | 3        | 1        | 12         | ..    | ..   | 18      | ..  | 27                           | ..         | 4.7        |     |    |     |    |     |
| July                   | 10.4                                  | 35.1             | 22.4    | 41                    | 7                                  | 6       | 7       | 81.4           | 28.9             | 20       | 6                    | 25          | ..          | ..          | 31          | 12             | 3        | 1        | ..       | 15         | ..    | ..   | 14      | ..  | 24                           | ..         | 4.3        |     |    |     |    |     |
| August                 | 10.8                                  | 35.2             | 22.3    | 44                    | 7                                  | 7       | 7       | 260.0          | 41.7             | 26       | 2                    | 29          | ..          | ..          | 31          | 21             | 8        | 6        | ..       | 12         | 1     | ..   | 17      | ..  | 30                           | ..         | 4.3        |     |    |     |    |     |
| September              | 11.4                                  | 34.4             | 21.5    | 46                    | 7                                  | 7       | 7       | 389.3          | 87.5             | 14       | ..                   | 30          | ..          | 1           | 29          | 21             | 12       | 7        | 1        | 12         | 2     | ..   | 18      | ..  | 30                           | ..         | 4.3        |     |    |     |    |     |
| October                | 10.9                                  | 34.5             | 22.3    | 46                    | 7                                  | 7       | 7       | 203.5          | 24.1             | 7        | 2                    | 29          | ..          | ..          | 31          | 19             | 10       | ..       | ..       | 14         | 2     | ..   | 15      | ..  | 31                           | ..         | 4.3        |     |    |     |    |     |
| November               | 12.3                                  | 34.6             | 22.1    | 43                    | 7                                  | 6       | 7       | 128.3          | 35.8             | 27       | 2                    | 28          | ..          | ..          | 30          | 15             | 4        | 1        | ..       | 11         | 1     | ..   | 12      | ..  | 25                           | ..         | 4.1        |     |    |     |    |     |
| December               | 11.7                                  | 34.8             | 21.3    | 42                    | 7                                  | 7       | 7       | 259.8          | 84.4             | 17       | 1                    | 25          | 5           | 2           | 29          | 22             | 5        | 3        | 1        | 6          | ..    | ..   | 11      | ..  | 27                           | ..         | 3.2        |     |    |     |    |     |
| <b>Total</b>           | ..                                    | ..               | ..      | ..                    | ..                                 | ..      | ..      | 2107.5         | ..               | ..       | ..                   | ..          | ..          | ..          | ..          | 106            | 254      | 5        | 5        | 360        | 179   | 62   | 29      | 4   | 120                          | 7          | ..         | 173 | .. | 301 | .. | ..  |
| <b>Mean or Extreme</b> | 1011.3                                | 35.1             | 21.0    | 31                    | 7                                  | 6       | 7       | ..             | 89.0             | ..       | ..                   | ..          | ..          | ..          | ..          | ..             | ..       | ..       | ..       | ..         | ..    | ..   | ..      | ..  | ..                           | ..         | ..         | ..  | .. | ..  | .. | 4.5 |

† The mean amount of cloud at hours of observation on a day of blue sky < 3 oktas, on an overcast day > 6 oktas.  
 F ≥ 6 Beaufort force greater than 10.7 m/s.  
 F ≥ 8 Beaufort force greater than 17.1 m/s.

### SURFACE WIND

| Month       | Percentage Frequency and Mean Velocity of Winds from The Various Directions |     |      |     |      |     |     |     |      |     |      |     |     |     |     |     |      | Distribution of Wind |              |             |           |                  |    |    |    |    |    |    |    |    |    |
|-------------|---|-----|------|-----|------|-----|-----|-----|------|-----|------|-----|-----|-----|-----|-----|------|----------------------|--------------|-------------|-----------|------------------|----|----|----|----|----|----|----|----|----|
|             | N   |     | NE   |     | E    |     | SE  |     | S    |     | SW   |     | W   |     | NW  |     | Calm | >10.7 m/s            | 5.5-10.7 m/s | 1.5-5.4 m/s | 0-1.5 m/s | Defective Record |    |    |    |    |    |    |    |    |    |
|             | %   | m/s | %    | m/s | %    | m/s | %   | m/s | %    | m/s | %    | m/s | %   | m/s | %   | m/s | %    | hr.                  | hr.          | hr.         | hr.       | hr.              |    |    |    |    |    |    |    |    |    |
| January     | 4.2   | 2.0 | 36.7 | 2.0 | 12.4 | 1.1 | 1.5 | 1.3 | 20.1 | 2.5 | 9.7  | 3.0 | 1.5 | 1.6 | 0.9 | 2.1 | 13.1 | ..                   | 5            | 391         | 346       | 2                |    |    |    |    |    |    |    |    |    |
| February    | 1.3   | 1.9 | 31.4 | 1.6 | 8.6  | 0.9 | 1.9 | 1.7 | 18.9 | 2.7 | 18.1 | 3.6 | 1.2 | 2.6 | 0.7 | 1.3 | 17.7 | ..                   | 28           | 291         | 353       | ..               |    |    |    |    |    |    |    |    |    |
| March       | 2.5   | 1.6 | 36.5 | 1.5 | 10.5 | 0.9 | 2.7 | 1.9 | 21.0 | 2.7 | 11.5 | 3.3 | 0.8 | 1.9 | 0.5 | 1.7 | 13.8 | ..                   | 15           | 317         | 412       | ..               |    |    |    |    |    |    |    |    |    |
| April       | 1.7   | 1.8 | 30.7 | 1.4 | 6.8  | 1.0 | 1.7 | 1.5 | 24.0 | 2.7 | 11.1 | 3.1 | 0.7 | 1.6 | 1.0 | 1.0 | 22.4 | ..                   | 10           | 291         | 419       | ..               |    |    |    |    |    |    |    |    |    |
| May         | 2.0   | 1.4 | 31.9 | 1.4 | 7.5  | 0.8 | 1.6 | 1.7 | 18.8 | 2.1 | 15.5 | 2.3 | 1.6 | 1.9 | 0.9 | 1.1 | 20.2 | ..                   | 5            | 267         | 472       | ..               |    |    |    |    |    |    |    |    |    |
| June        | 2.4   | 1.9 | 27.4 | 1.5 | 14.3 | 0.9 | 1.7 | 1.3 | 12.1 | 2.5 | 21.5 | 3.3 | 0.8 | 3.1 | 0.5 | 1.5 | 19.2 | ..                   | 21           | 284         | 414       | 1                |    |    |    |    |    |    |    |    |    |
| July        | 4.8   | 2.2 | 29.0 | 1.6 | 14.1 | 1.1 | 2.0 | 2.2 | 14.7 | 3.0 | 16.0 | 3.4 | 1.6 | 3.3 | 1.9 | 1.5 | 15.9 | ..                   | 32           | 303         | 409       | ..               |    |    |    |    |    |    |    |    |    |
| August      | 2.4   | 1.7 | 31.7 | 1.7 | 13.8 | 0.9 | 1.7 | 1.7 | 15.3 | 2.3 | 16.0 | 2.9 | 1.5 | 2.6 | 0.4 | 2.2 | 17.1 | ..                   | 14           | 314         | 416       | ..               |    |    |    |    |    |    |    |    |    |
| September   | 4.3   | 1.9 | 39.0 | 1.6 | 11.1 | 1.0 | 2.2 | 1.7 | 13.6 | 2.7 | 14.5 | 3.1 | 1.0 | 1.4 | 0.4 | 3.3 | 13.8 | ..                   | 22           | 290         | 406       | 2                |    |    |    |    |    |    |    |    |    |
| October     | 2.4   | 1.6 | 31.5 | 1.7 | 12.5 | 0.9 | 1.7 | 2.1 | 14.7 | 2.4 | 15.9 | 3.3 | 1.9 | 1.8 | 0.9 | 1.7 | 18.5 | ..                   | 19           | 308         | 417       | ..               |    |    |    |    |    |    |    |    |    |
| November    | 8.1   | 2.9 | 38.7 | 2.2 | 12.7 | 0.9 | 2.8 | 1.4 | 8.5  | 2.7 | 10.9 | 3.2 | 0.8 | 2.9 | 2.1 | 3.5 | 15.5 | ..                   | 22           | 337         | 359       | 2                |    |    |    |    |    |    |    |    |    |
| December    | 13.4  | 1.6 | 35.5 | 1.9 | 3.1  | 0.8 | 4.8 | 1.8 | 13.2 | 2.3 | 3.5  | 2.3 | 2.1 | 2.2 | 1.2 | 2.1 | 23.1 | ..                   | 8            | 274         | 462       | ..               |    |    |    |    |    |    |    |    |    |
| <b>Mean</b> | 4.1   | 1.9 | 33.3 | 1.7 | 10.6 | 0.9 | 2.2 | 1.7 | 16.2 | 2.5 | 13.7 | 3.1 | 1.3 | 2.2 | 0.9 | 1.9 | 17.5 | ..                   | ..           | ..          | ..        | ..               | .. | .. | .. | .. | .. | .. | .. | .. | .. |

### SUNSHINE DURATION ( Hour )

Year : 1983

| Hour      | Mean Hourly          |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      | Mean Daily | M.S.D.<br>A.S.D.<br>(%) | Number of Days |                          |                          |                          |              |
|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------|-------------------------|----------------|--------------------------|--------------------------|--------------------------|--------------|
|           | 05.30<br>to<br>06.30 | 06.30<br>to<br>07.30 | 07.30<br>to<br>08.30 | 08.30<br>to<br>09.30 | 09.30<br>to<br>10.30 | 10.30<br>to<br>11.30 | 11.30<br>to<br>12.30 | 12.30<br>to<br>13.30 | 13.30<br>to<br>14.30 | 14.30<br>to<br>15.30 | 15.30<br>to<br>16.30 | 16.30<br>to<br>17.30 | 17.30<br>to<br>18.30 |            |                         | 0<br>hr.       | 0.1<br>to<br>3.0<br>hrs. | 3.1<br>to<br>6.0<br>hrs. | 6.1<br>to<br>9.0<br>hrs. | >9.0<br>hrs. |
| Month     |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |                      |            |                         |                |                          |                          |                          |              |
| January   | 0.00                 | 0.55                 | 0.85                 | 0.90                 | 0.95                 | 0.90                 | 0.80                 | 0.65                 | 0.60                 | 0.50                 | 0.40                 | 0.10                 | 0.00                 | 7.15       | 60                      | 0              | 2                        | 6                        | 13                       | 10           |
| February  | 0.00                 | 0.55                 | 0.90                 | 0.95                 | 0.95                 | 0.95                 | 0.95                 | 0.95                 | 0.85                 | 0.70                 | 0.55                 | 0.30                 | 0.00                 | 8.65       | 73                      | 0              | 0                        | 1                        | 14                       | 13           |
| March     | 0.00                 | 0.35                 | 0.80                 | 0.90                 | 0.95                 | 0.95                 | 1.00                 | 0.90                 | 0.75                 | 0.65                 | 0.45                 | 0.05                 | 0.00                 | 7.80       | 65                      | 0              | 0                        | 4                        | 17                       | 10           |
| April     | 0.00                 | 0.10                 | 0.60                 | 0.90                 | 0.95                 | 0.95                 | 0.90                 | 0.95                 | 0.75                 | 0.50                 | 0.20                 | 0.00                 | 0.00                 | 6.80       | 56                      | 0              | 0                        | 9                        | 19                       | 2            |
| May       | 0.00                 | 0.40                 | 0.65                 | 0.80                 | 0.90                 | 0.85                 | 0.85                 | 0.70                 | 0.55                 | 0.40                 | 0.35                 | 0.20                 | 0.00                 | 6.65       | 54                      | 0              | 4                        | 7                        | 17                       | 3            |
| June      | 0.05                 | 0.35                 | 0.60                 | 0.80                 | 0.85                 | 0.90                 | 0.85                 | 0.90                 | 0.75                 | 0.55                 | 0.35                 | 0.10                 | 0.00                 | 7.05       | 57                      | 0              | 0                        | 9                        | 19                       | 2            |
| July      | 0.05                 | 0.40                 | 0.55                 | 0.70                 | 0.85                 | 0.90                 | 0.90                 | 0.80                 | 0.60                 | 0.40                 | 0.40                 | 0.20                 | 0.00                 | 6.75       | 55                      | 1              | 1                        | 6                        | 20                       | 3            |
| August    | 0.00                 | 0.30                 | 0.45                 | 0.65                 | 0.65                 | 0.60                 | 0.60                 | 0.70                 | 0.50                 | 0.40                 | 0.25                 | 0.15                 | 0.00                 | 5.25       | 43                      | 0              | 8                        | 9                        | 13                       | 1            |
| September | 0.00                 | 0.30                 | 0.55                 | 0.55                 | 0.70                 | 0.75                 | 0.65                 | 0.65                 | 0.60                 | 0.40                 | 0.30                 | 0.10                 | 0.00                 | 5.65       | 47                      | 0              | 3                        | 10                       | 16                       | 1            |
| October   | 0.00                 | 0.20                 | 0.55                 | 0.70                 | 0.80                 | 0.80                 | 0.80                 | 0.65                 | 0.55                 | 0.40                 | 0.30                 | 0.10                 | 0.00                 | 5.85       | 49                      | 0              | 4                        | 10                       | 17                       | 0            |
| November  | 0.00                 | 0.15                 | 0.50                 | 0.75                 | 0.80                 | 0.80                 | 0.75                 | 0.70                 | 0.55                 | 0.55                 | 0.35                 | 0.15                 | 0.00                 | 6.15       | 52                      | 0              | 4                        | 8                        | 16                       | 2            |
| December  | 0.00                 | 0.10                 | 0.30                 | 0.40                 | 0.55                 | 0.50                 | 0.50                 | 0.45                 | 0.35                 | 0.30                 | 0.15                 | 0.05                 | 0.00                 | 3.65       | 31                      | 4              | 12                       | 7                        | 6                        | 2            |
| Total     | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..                   | ..         | ..                      | 5              | 38                       | 86                       | 187                      | 49           |
| Mean      | 0.00                 | 0.30                 | 0.60                 | 0.75                 | 0.80                 | 0.80                 | 0.80                 | 0.75                 | 0.60                 | 0.45                 | 0.35                 | 0.10                 | 0.00                 | 6.45       | 53                      | ..             | ..                       | ..                       | ..                       | ..           |

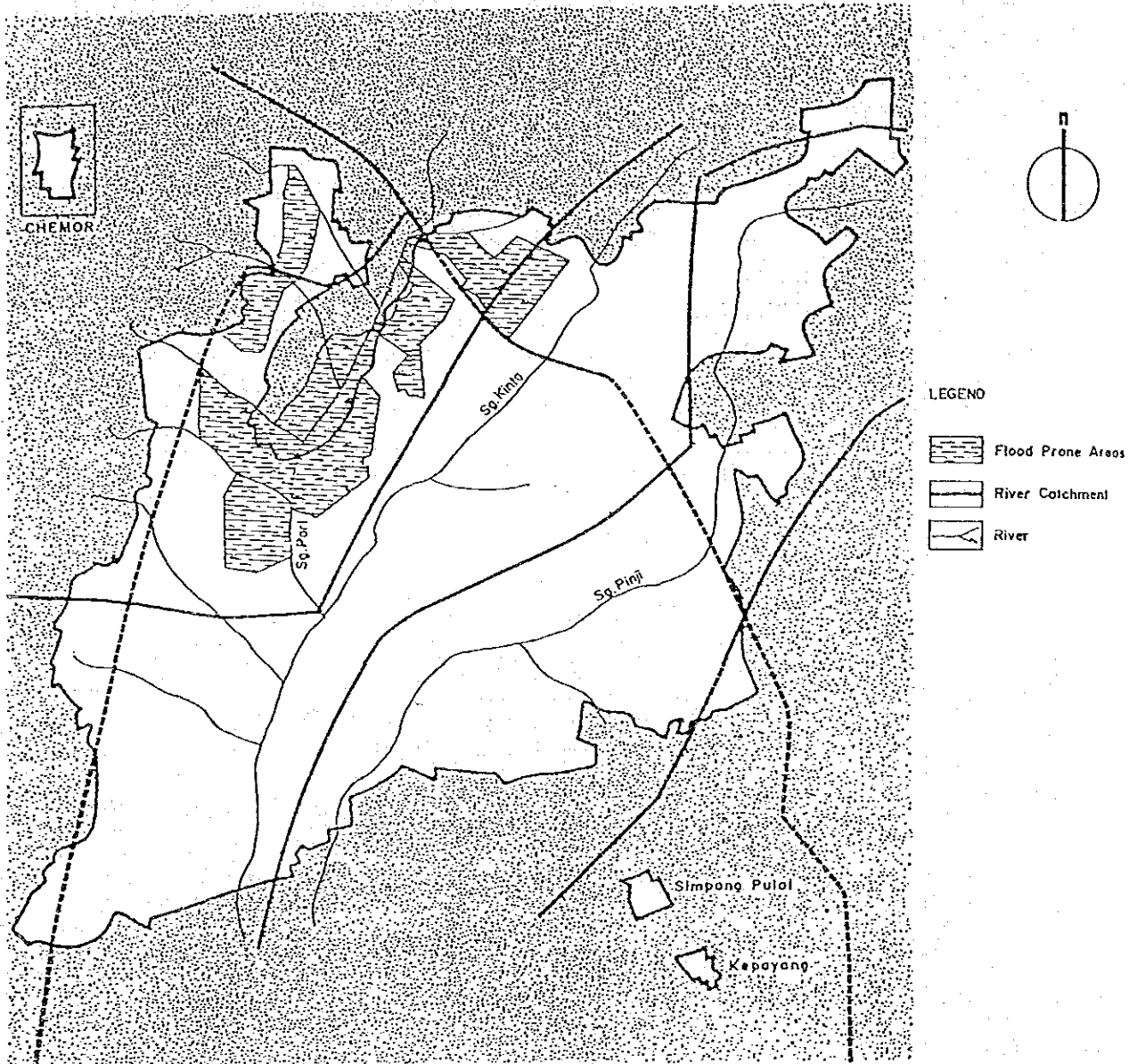
M.S.D. = Mean Sunshine Duration.  
A.S.D. = Astronomical Sunshine Duration.

### RAINFALL AMOUNT ( mm. )

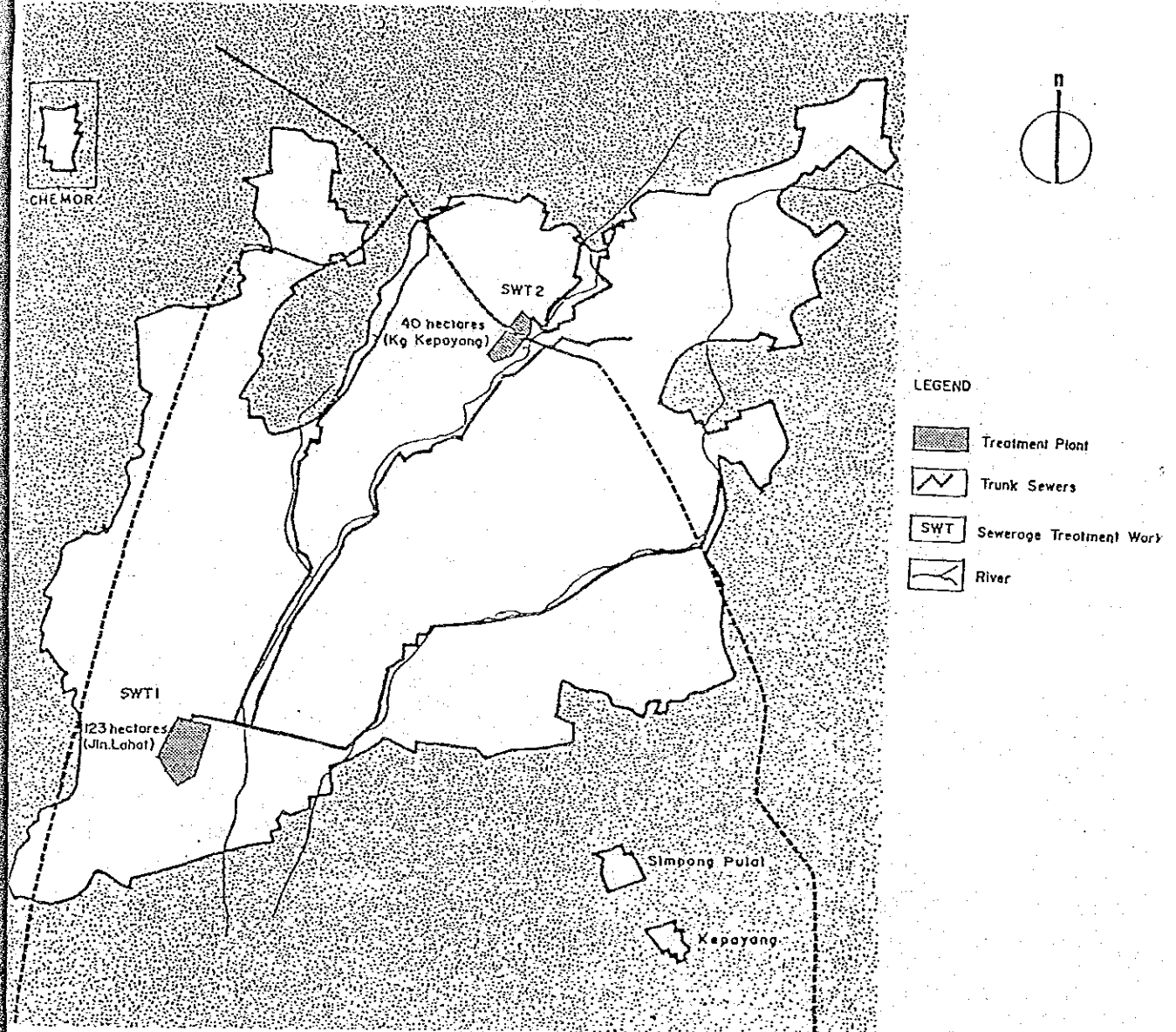
| Hour<br>Month | Hourly Total |      |      |      |      |      |      |      |      |      |       |       |       |       |       |       |       |       |       |       |       |       |       | Monthly<br>Total |        |
|---------------|--------------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|--------|
|               | 0-1          | 1-2  | 2-3  | 3-4  | 4-5  | 5-6  | 6-7  | 7-8  | 8-9  | 9-10 | 10-11 | 11-12 | 12-13 | 13-14 | 14-15 | 15-16 | 16-17 | 17-18 | 18-19 | 19-20 | 20-21 | 21-22 | 22-23 |                  | 23-24  |
| January       | 0.1          | 0.8  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 6.2   | 0.2   | 0.0   | 9.0   | 27.4  | 5.9   | 1.0   | 1.1   | 0.0   | 0.0   | 0.3              | 52.0   |
| February      | 0.0          | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 7.9   | 43.3  | 13.7  | 30.0  | 5.9   | 2.2   | 0.0   | 0.0   | 0.0              | 103.0  |
| March         | 0.6          | 1.7  | 0.0  | 0.0  | 1.3  | 3.1  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 17.3  | 19.7  | 0.8   | 30.4  | 61.2  | 25.7  | 2.6   | 6.6   | 0.0   | 0.0   | 0.5              | 165.5  |
| April         | 0.6          | 0.1  | 0.2  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 32.7  | 49.9  | 55.7  | 11.7  | 0.0   | 12.3  | 17.5  | 0.3   | 1.5              | 182.5  |
| May           | 6.0          | 2.1  | 1.4  | 1.1  | 0.1  | 1.2  | 1.7  | 21.2 | 0.9  | 1.2  | 0.0   | 0.0   | 7.2   | 1.1   | 3.8   | 18.9  | 1.5   | 0.1   | 17.3  | 0.0   | 0.1   | 1.5   | 4.1   | 2.8              | 95.3   |
| June          | 4.6          | 0.4  | 0.1  | 0.0  | 0.1  | 0.0  | 4.4  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0   | 0.0   | 1.2   | 1.0   | 23.7  | 54.6  | 59.1  | 10.9  | 11.2  | 4.9   | 5.2   | 5.5   | 186.9            |        |
| July          | 1.0          | 1.0  | 1.3  | 0.1  | 0.5  | 0.2  | 5.2  | 2.1  | 5.2  | 17.0 | 1.5   | 0.1   | 0.3   | 0.1   | 0.0   | 10.9  | 1.7   | 5.2   | 8.7   | 3.4   | 2.0   | 4.2   | 6.8   | 2.9              | 81.4   |
| August        | 0.2          | 1.0  | 2.4  | 0.1  | 1.6  | 3.1  | 1.2  | 0.3  | 1.4  | 0.1  | 0.2   | 0.8   | 18.7  | 25.5  | 2.3   | 12.4  | 19.9  | 42.4  | 84.1  | 10.8  | 13.9  | 2.8   | 5.8   | 9.0              | 260.0  |
| September     | 0.9          | 6.3  | 32.8 | 17.1 | 2.9  | 27.0 | 14.4 | 5.0  | 5.3  | 2.1  | 0.0   | 0.0   | 9.2   | 68.2  | 56.0  | 15.6  | 9.5   | 23.9  | 41.4  | 26.9  | 18.1  | 4.7   | 2.0   | 389.3            |        |
| October       | 0.0          | 0.0  | 0.0  | 0.0  | 16.1 | 11.1 | 1.5  | 0.8  | 2.6  | 0.0  | 0.0   | 2.6   | 0.0   | 63.6  | 22.3  | 21.6  | 6.6   | 2.2   | 14.6  | 20.9  | 6.9   | 7.2   | 2.2   | 0.7              | 203.5  |
| November      | 0.3          | 0.4  | 0.2  | 1.3  | 0.1  | 0.0  | 0.3  | 0.5  | 0.0  | 0.0  | 0.0   | 0.0   | 1.3   | 1.0   | 18.1  | 0.5   | 14.3  | 25.7  | 4.7   | 10.9  | 33.5  | 7.2   | 4.0   | 4.0              | 128.3  |
| December      | 25.1         | 2.4  | 2.4  | 2.9  | 3.2  | 1.1  | 1.0  | 2.1  | 1.9  | 2.5  | 2.4   | 2.0   | 1.6   | 0.8   | 1.7   | 61.1  | 48.2  | 59.5  | 16.3  | 5.4   | 0.5   | 0.7   | 3.9   | 11.1             | 259.8  |
| Total         | 39.4         | 16.2 | 40.8 | 22.6 | 25.9 | 46.8 | 29.7 | 32.0 | 17.3 | 22.9 | 4.1   | 5.5   | 29.1  | 124.8 | 137.5 | 223.8 | 264.1 | 357.2 | 302.0 | 113.2 | 111.2 | 64.1  | 37.0  | 40.3             | 2107.5 |

### 3-5 Conditions of Infrastructure

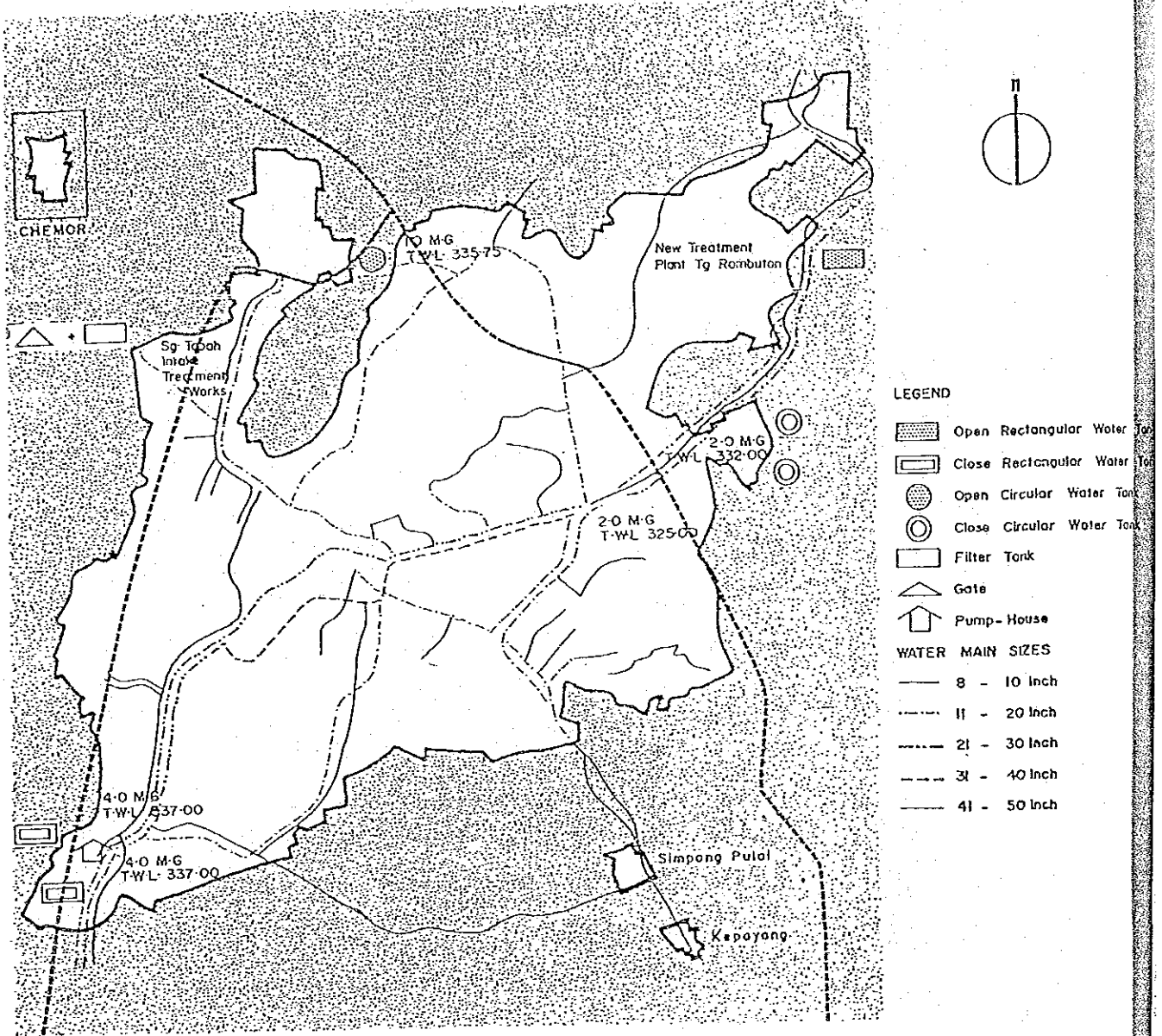
#### 3-5-1 Drainage System and Flood Prone Area



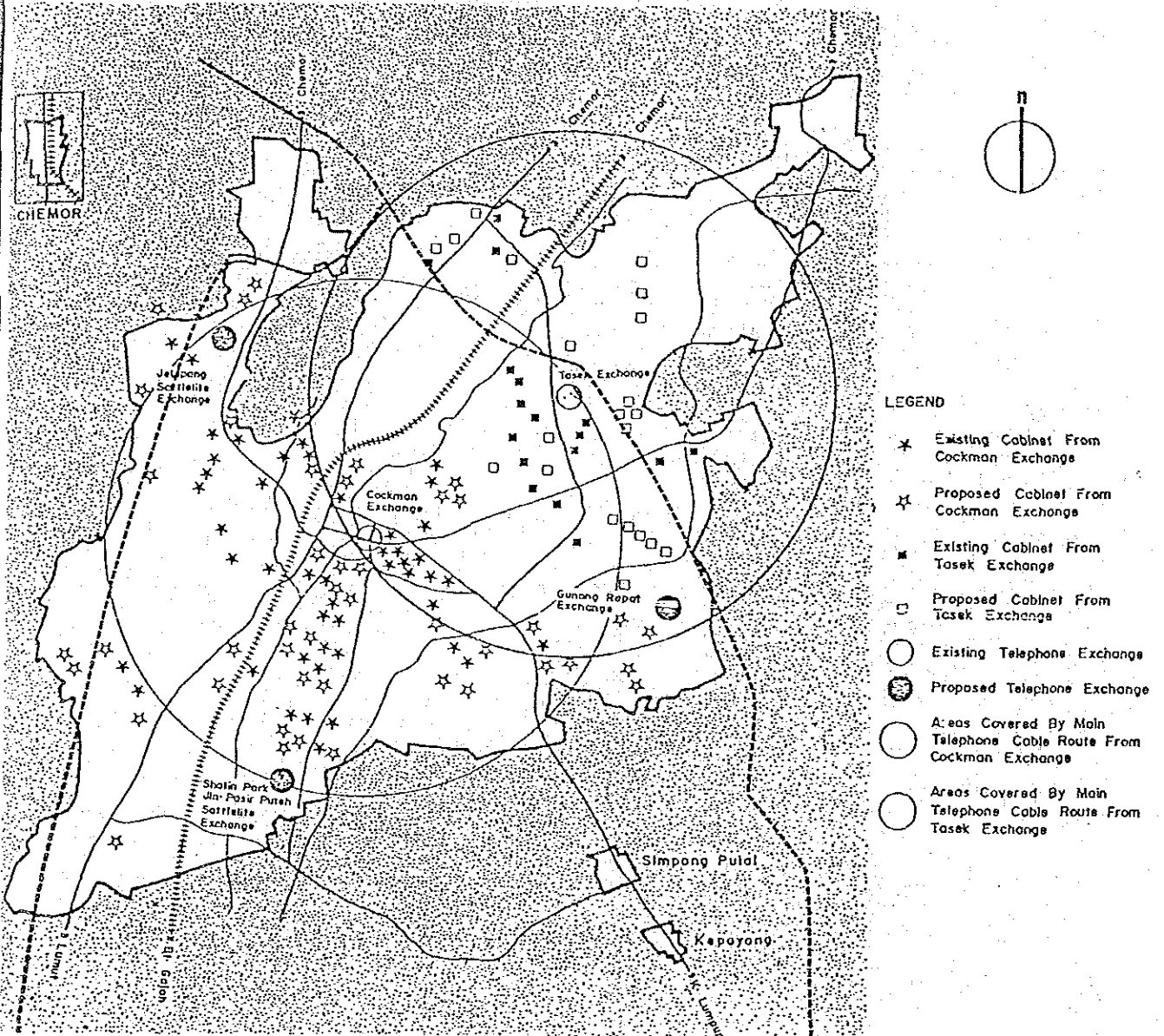
3-5-2 Sewerage System



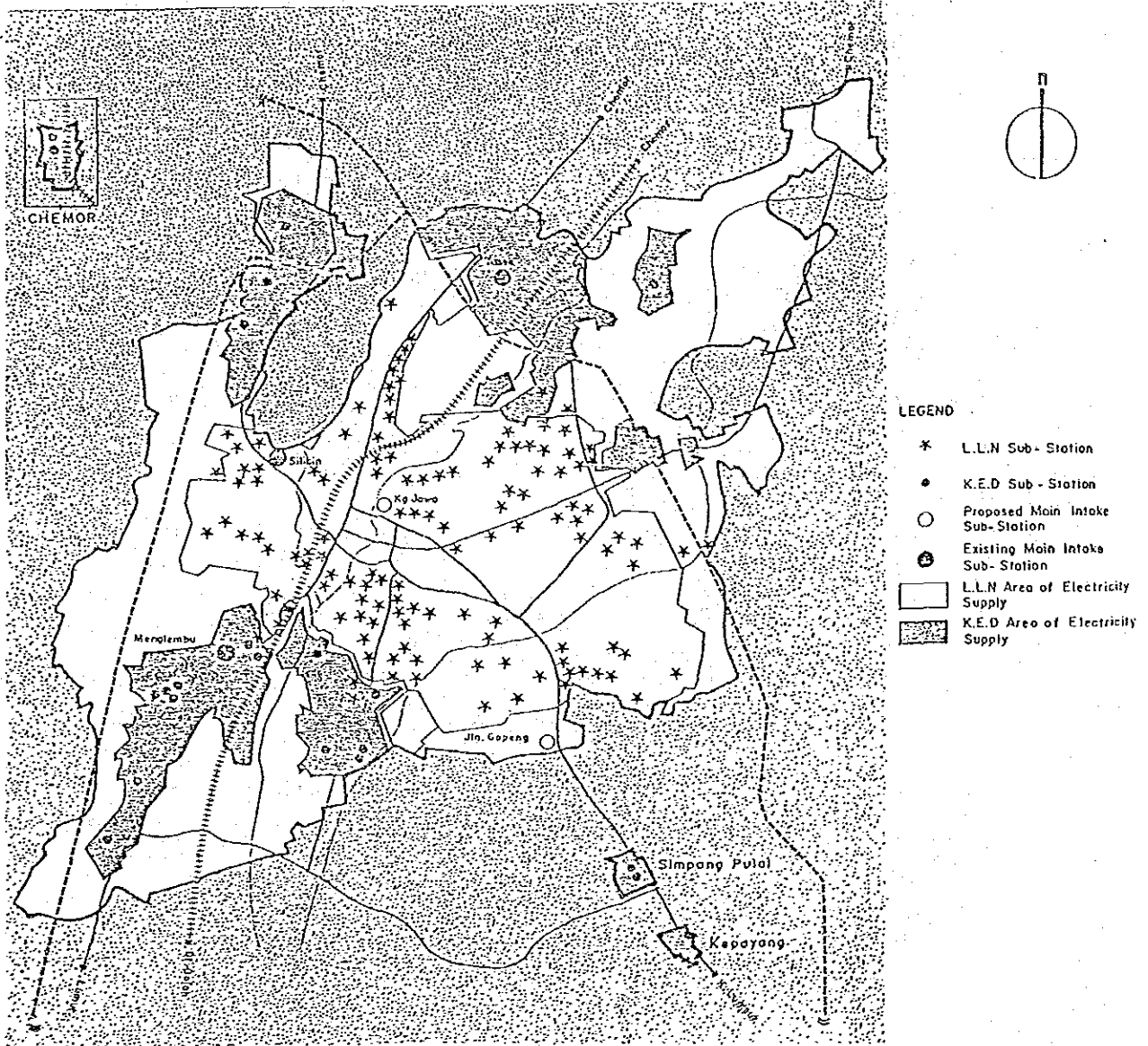
3-5-3 Water Supply



3-5-4 Telecommunication Services

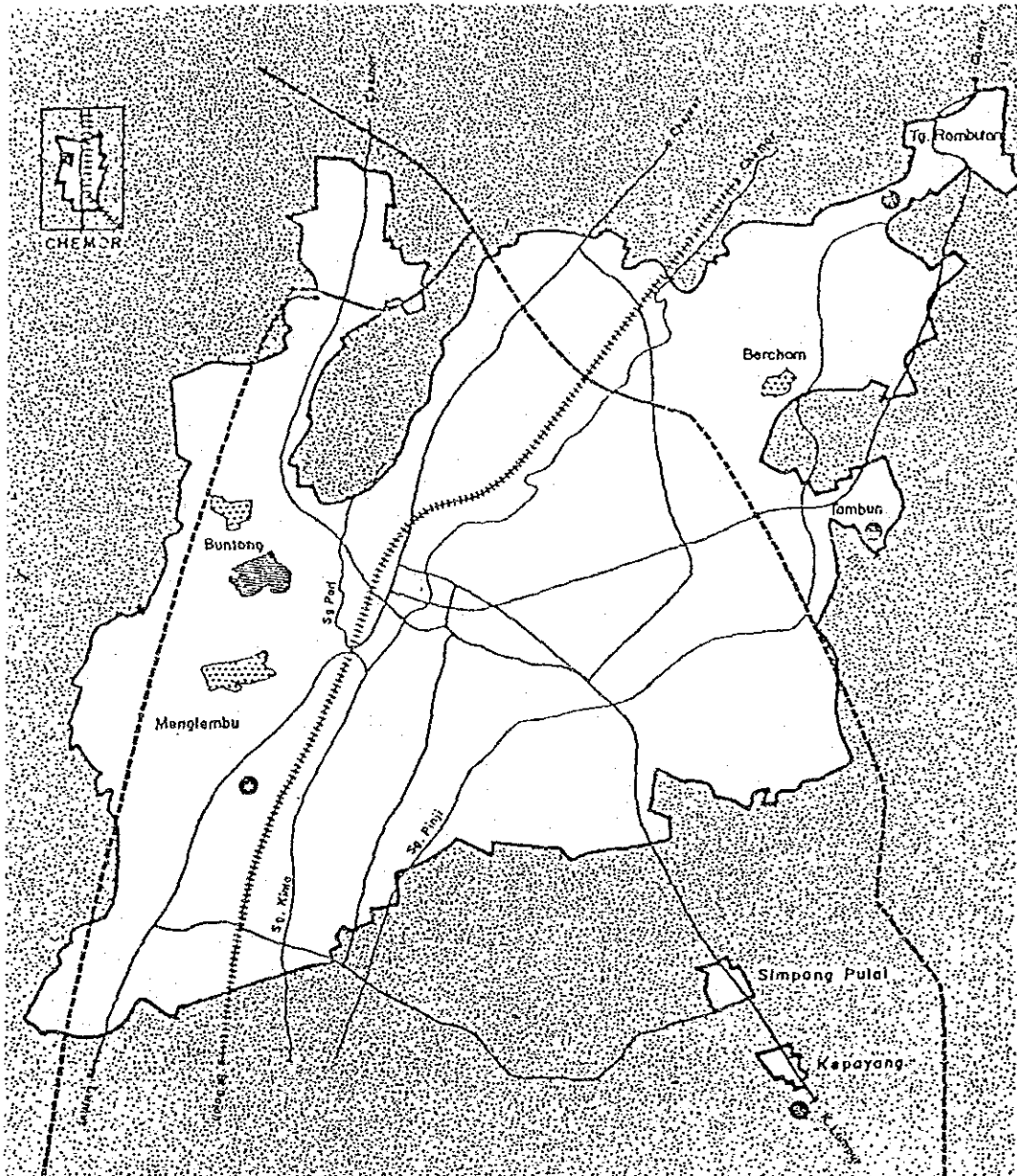


3-5-5 Electricity Supply








3-5-6 Disposal Areas



LEGEND

-  Existing Rubbish Dumping Ground
-  Trenching Ground
-  Proposed Dumping Ground.





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