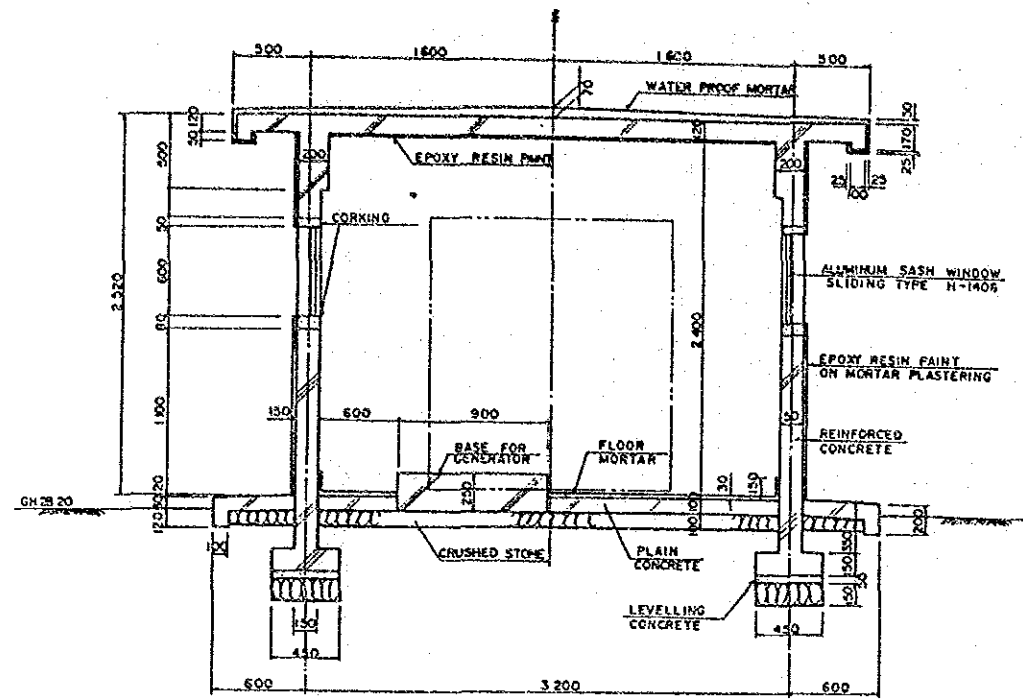
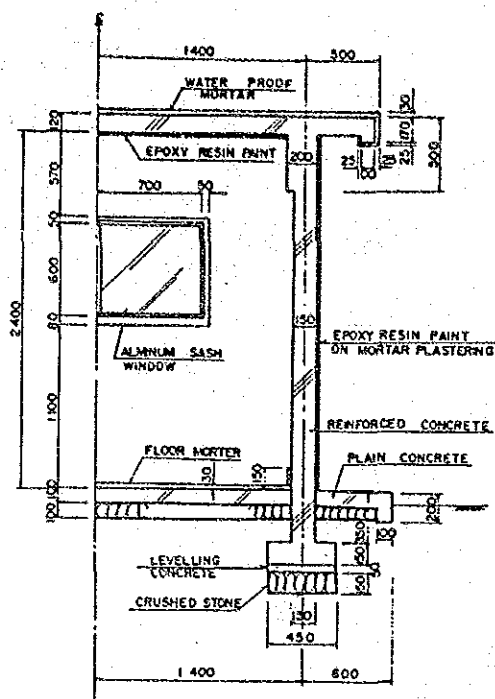


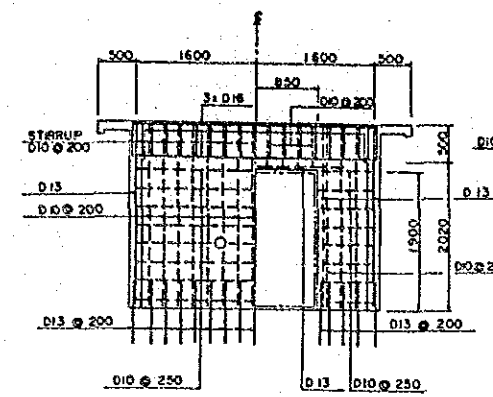
SECTION S-1:20



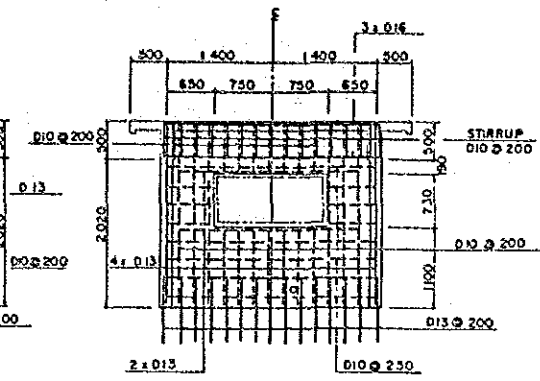
SECTION S-1:20



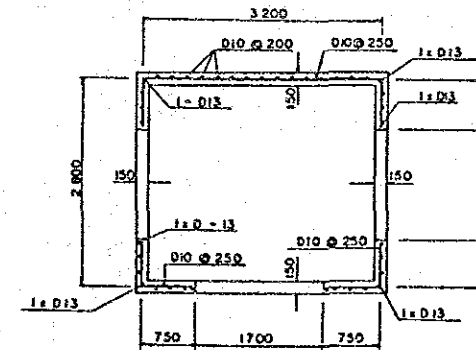
WALL S-1:40



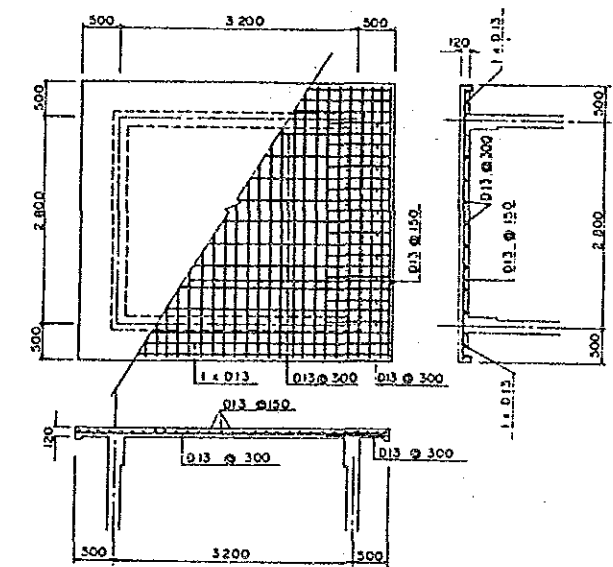
WALL S-1:40



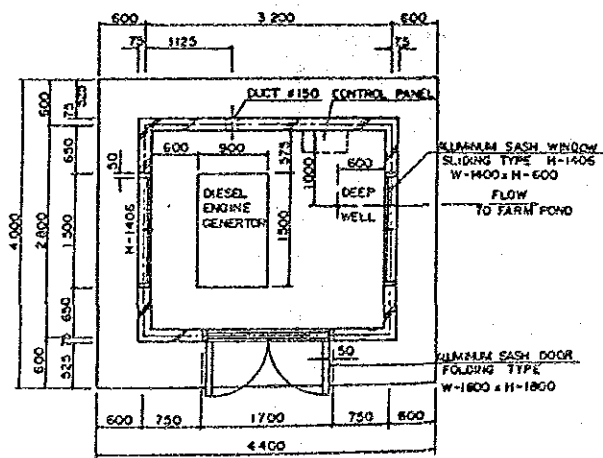
WALL SECTION S-1:40



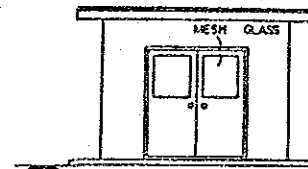
TOP SLAB S-1:40



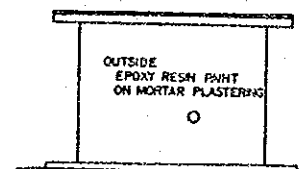
PLAN S-1:40



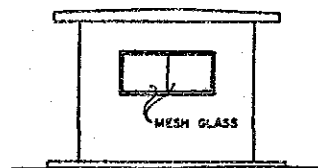
FRONT VIEW



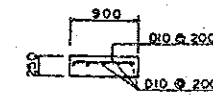
BACK SIDE



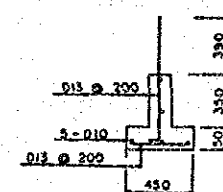
SIDE VIEW



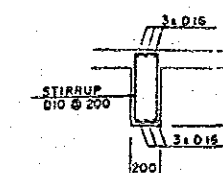
BASE FOR GENERATOR S-1:40



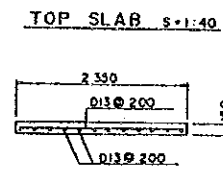
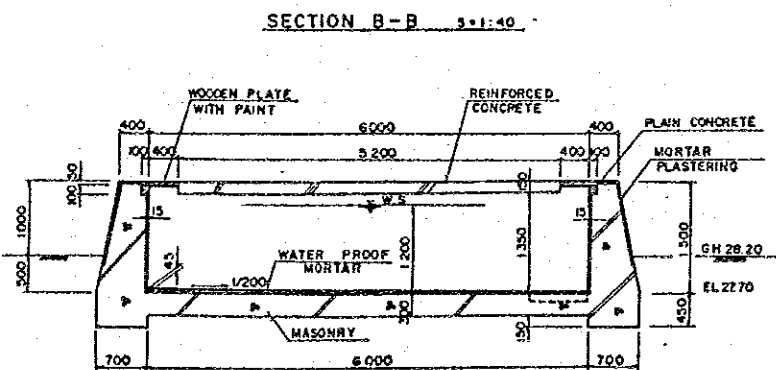
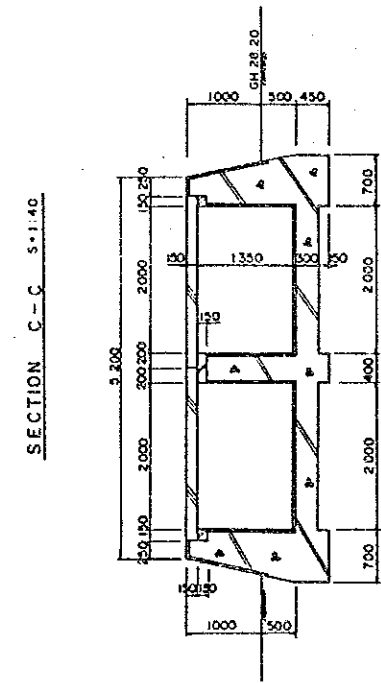
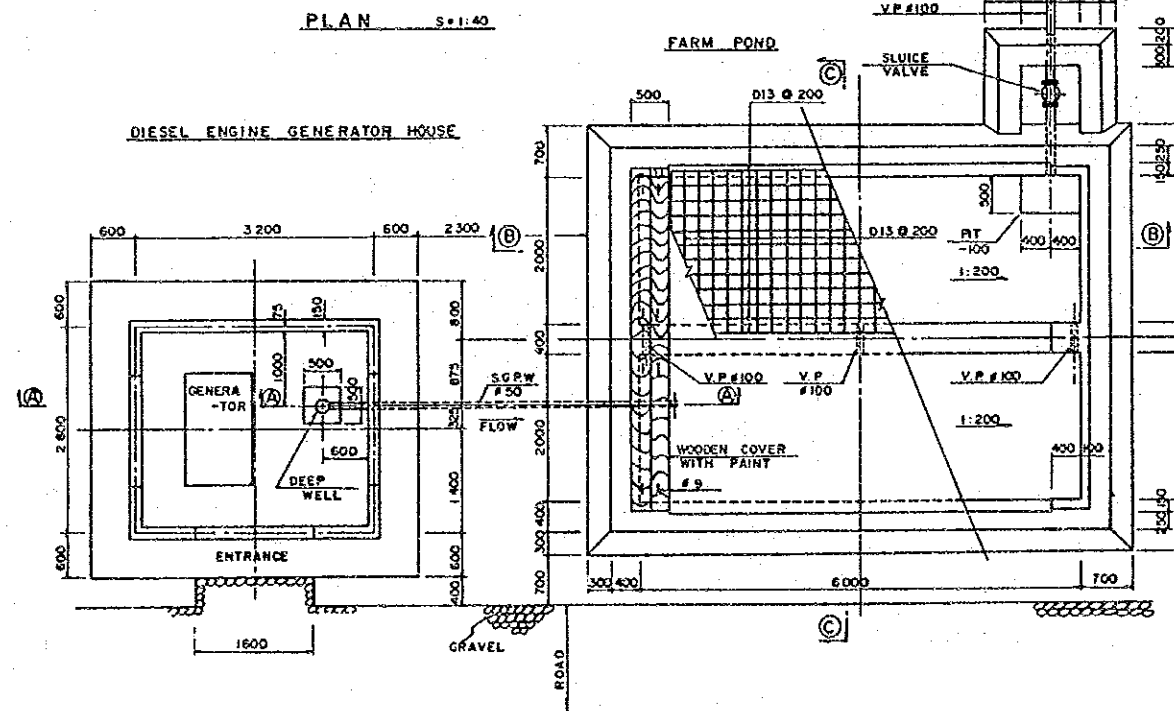
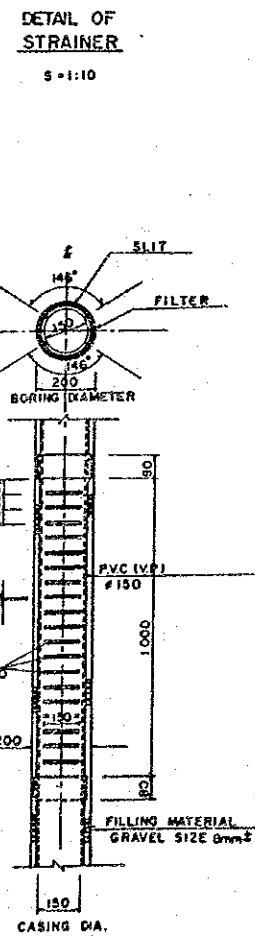
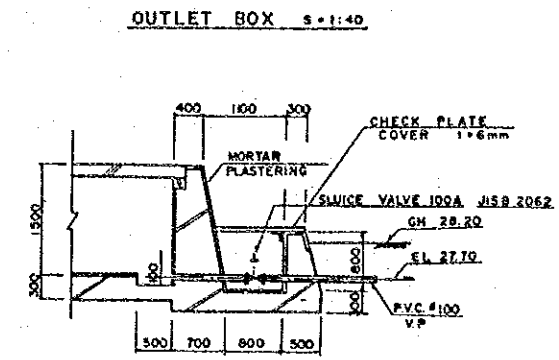
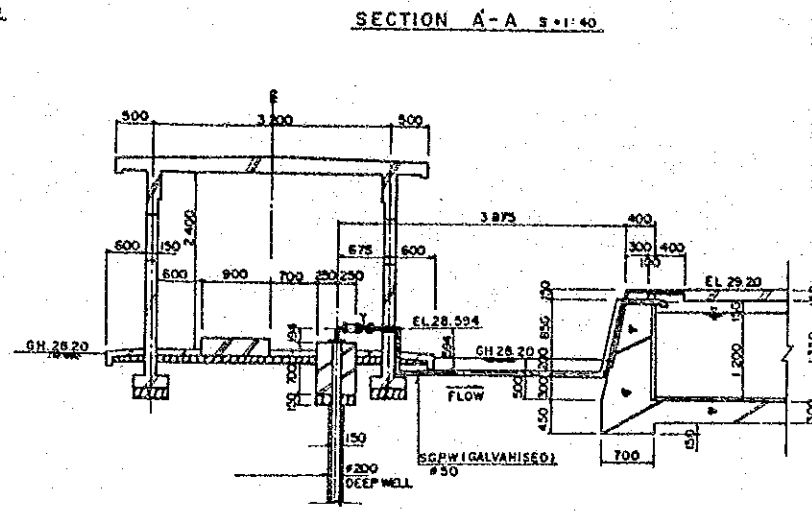
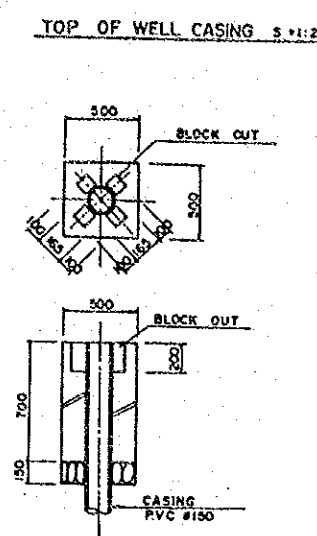
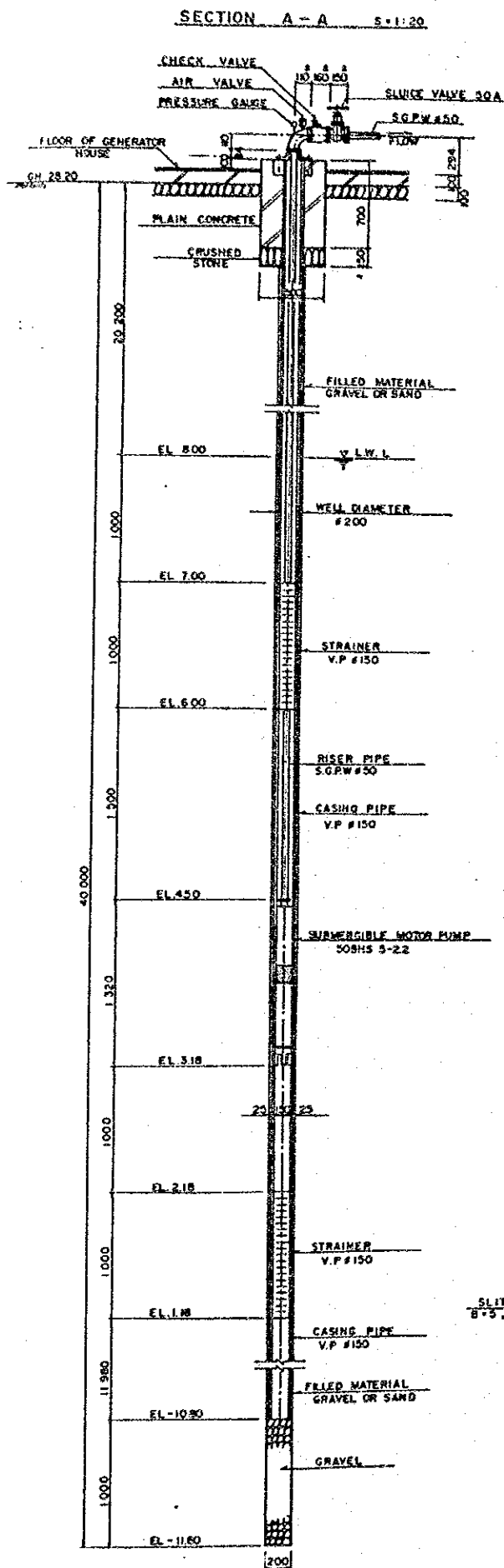
BASE WALL S-1:20



BEAM S-1:20



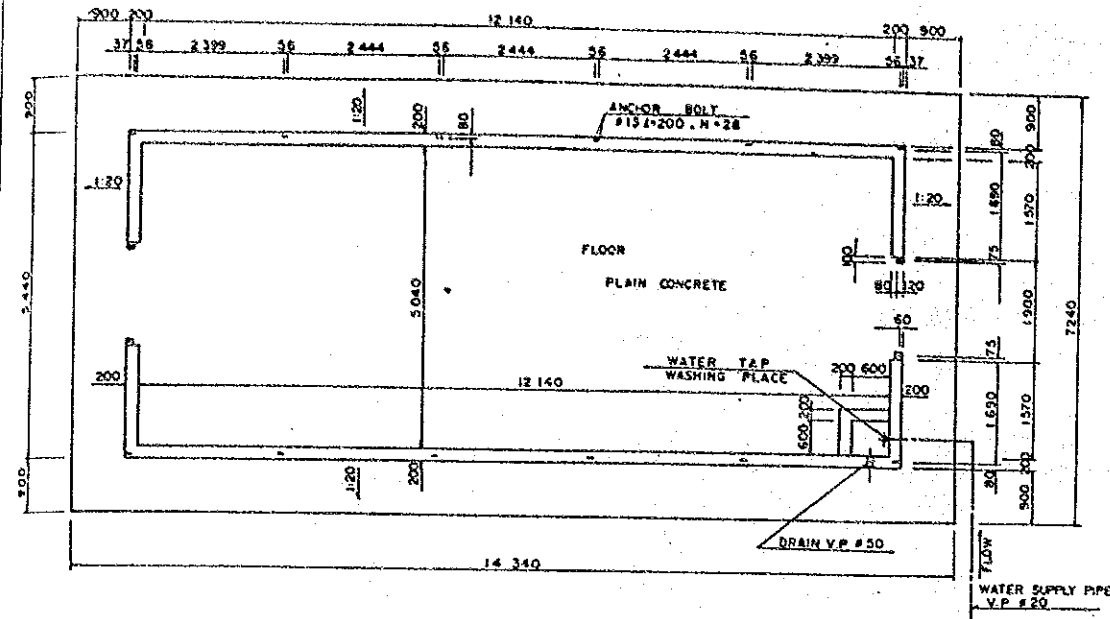
DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
 THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
 THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)  
 JATISKARE PESTS FORECASTING CENTER  
**DIESEL ENGINE GENERATOR HOUSE**  
 JAPAN INTERNATIONAL COOPERATION AGENCY  
 D.V.C. NO. J-14  
 TOKYO



DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
 THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
 THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)  
 JATISARI PESTS FORECASTING CENTER  
**DEEP WELL AND WATER TANK**  
 JAPAN INTERNATIONAL COOPERATION AGENCY  
 TOKYO

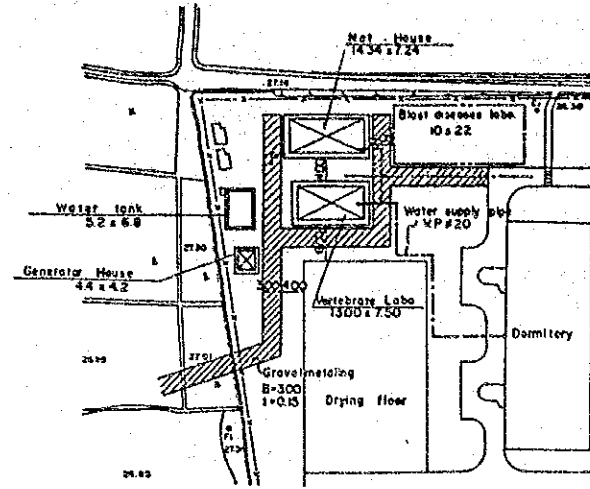
DWS. NO.  
**J-15**

FOUNDATION OF NET HOUSE 5:1:50 (For 2 places)

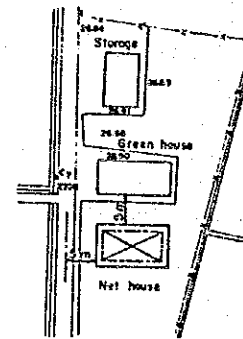


NOTE: WASHING SPACE & WATER SUPPLY PIPE ARE INSTALLED FOR ONE PLACE ONLY.

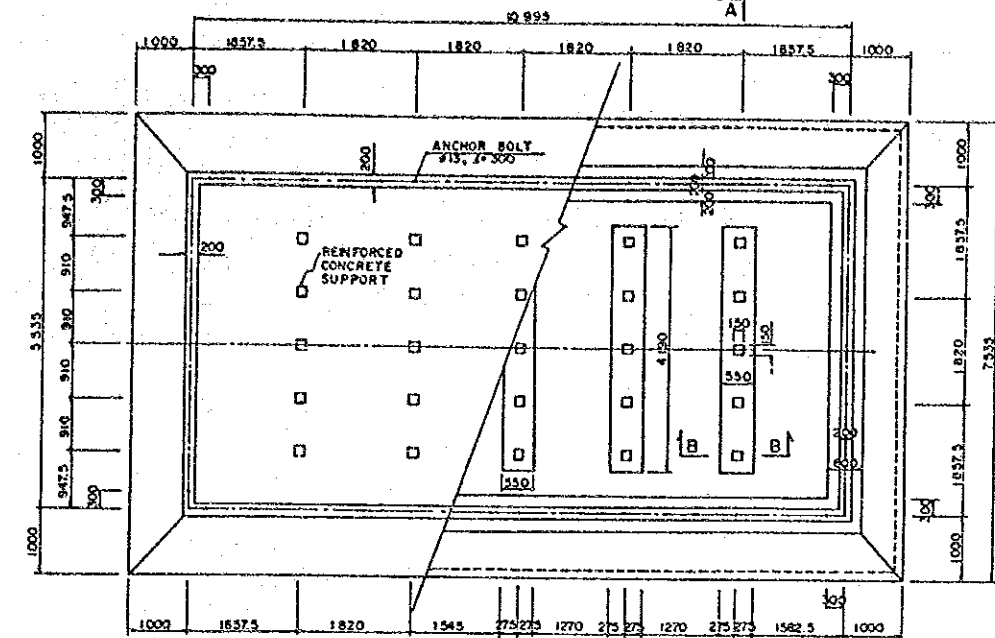
ARRANGEMENT OF HOUSE 5:1:500



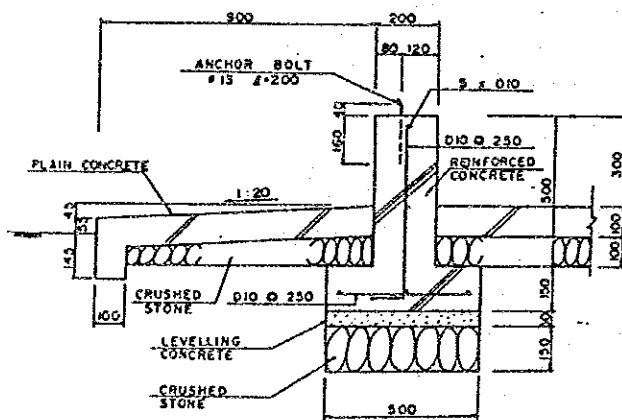
PLAN OF NET HOUSE 5:1:500



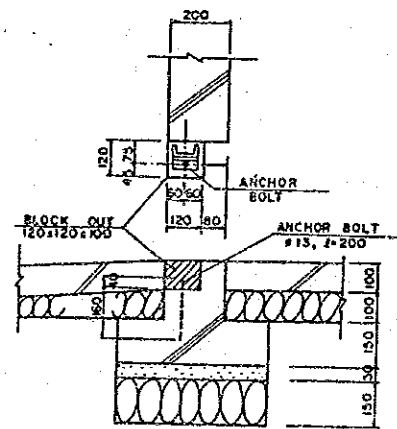
FOUNDATION OF VERTEBRATE LABORATORY 5:1:50



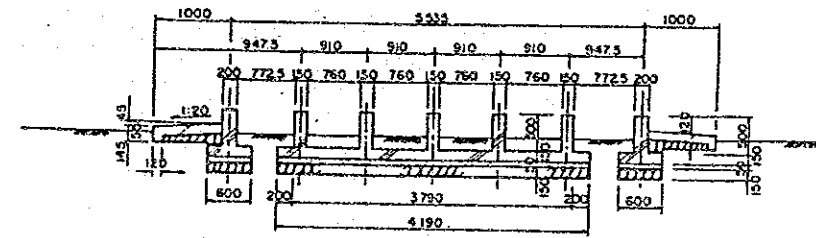
DETAIL OF WALL 5:1:10



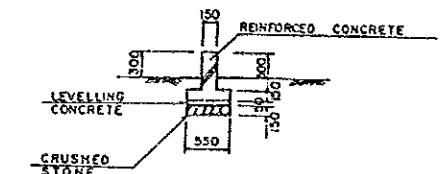
BLOCKOUT OF ENTRANCE 5:1:10



SECTION A-A 5:1:40

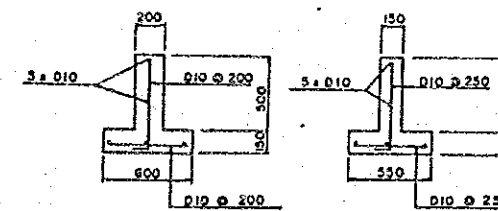


SECTION B-B 5:1:40

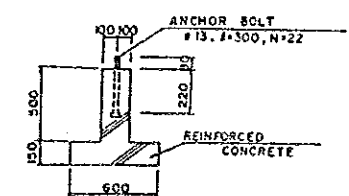


OUTSIDE WALL 5:1:20

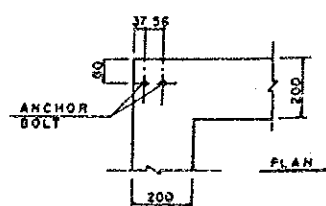
INSIDE SUPPORT 5:1:20



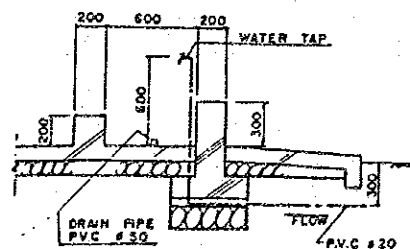
DETAILS OF ANCHOR BOLT 5:1:20



ANCHOR BOLT OF CORNER 5:1:10



WASHING PLACE 5:1:20



DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-1621)  
JATISARI PESTS FORECASTING CENTER  
FOUNDATIONS FOR NET HOUSE AND  
VERTEBRATE LABORATORY  
JAPAN INTERNATIONAL COOPERATION AGENCY  
1981  
Dwg. No. J-16

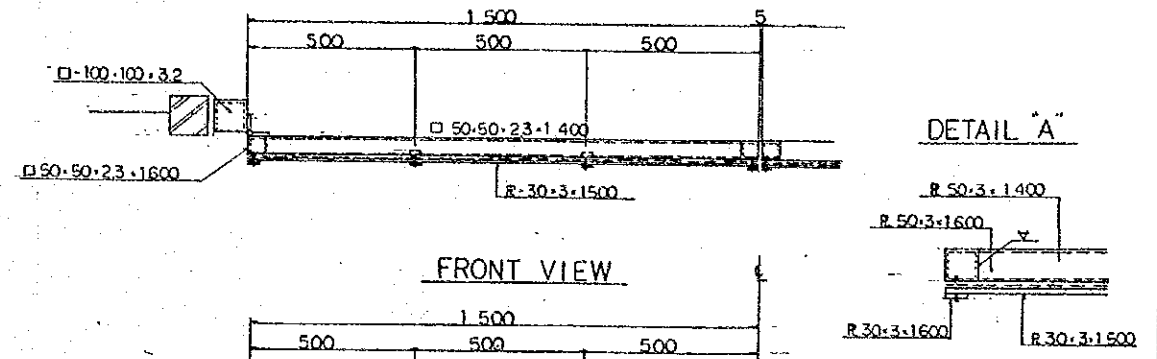
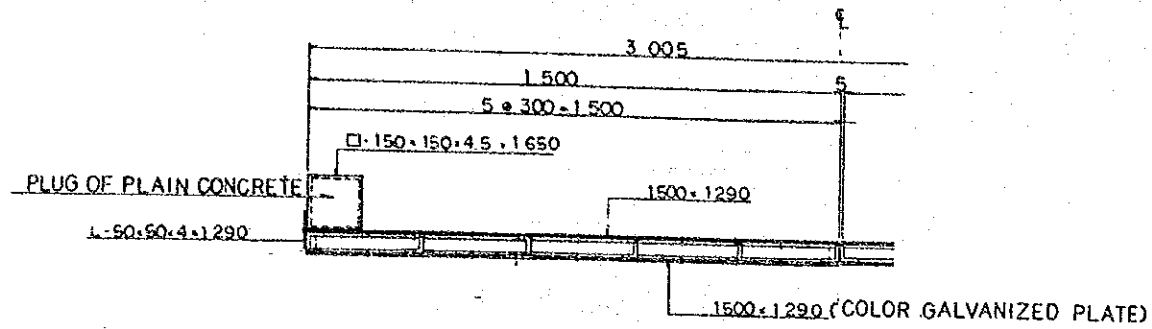


**AUTOMATIC GATE FOR RAT EXPERIMENTAL FARM**  
(1 PLACE)

**GATE FOR OPERATION ROAD**  
(2 PLACES)

**SECTION A-A**

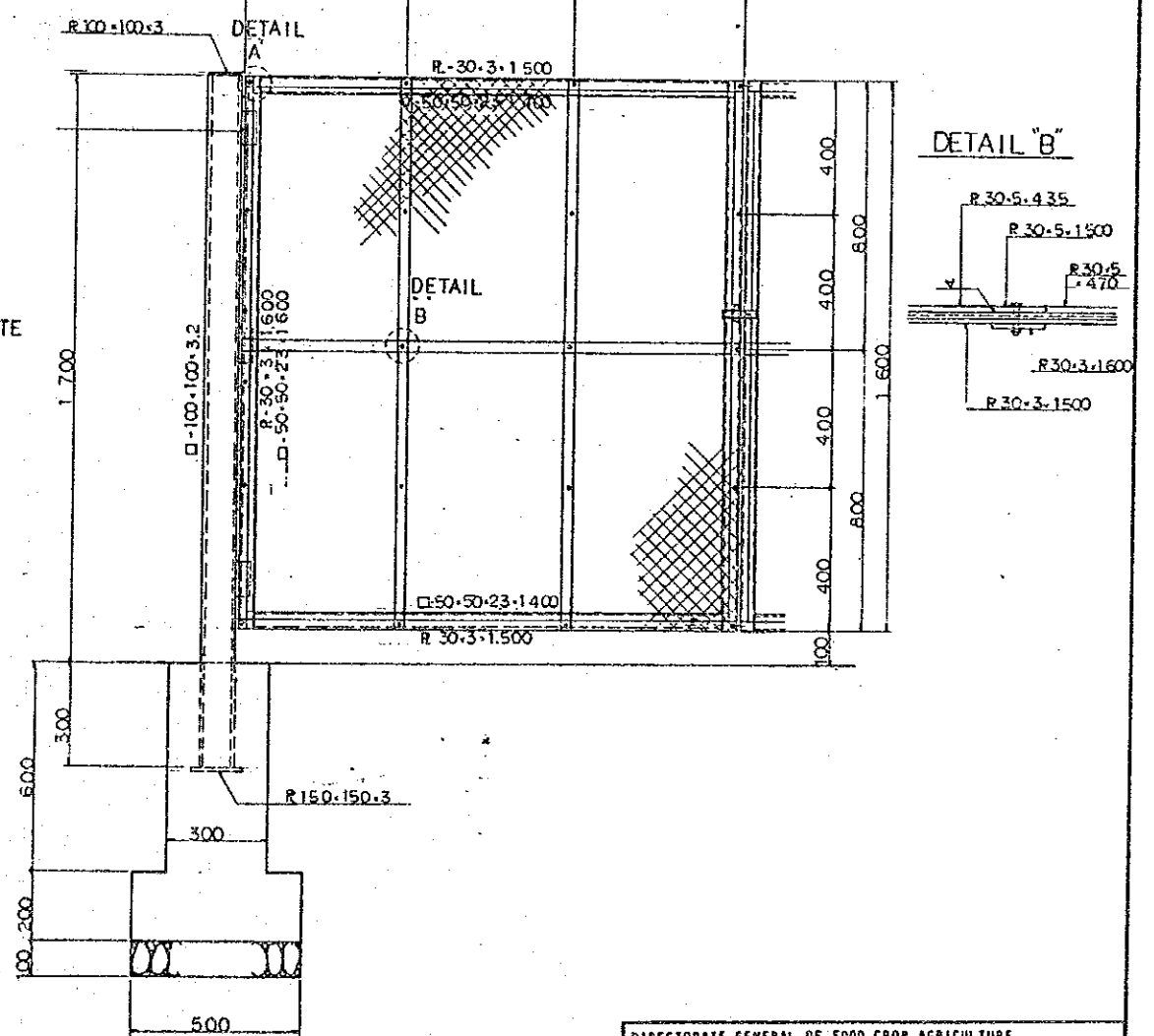
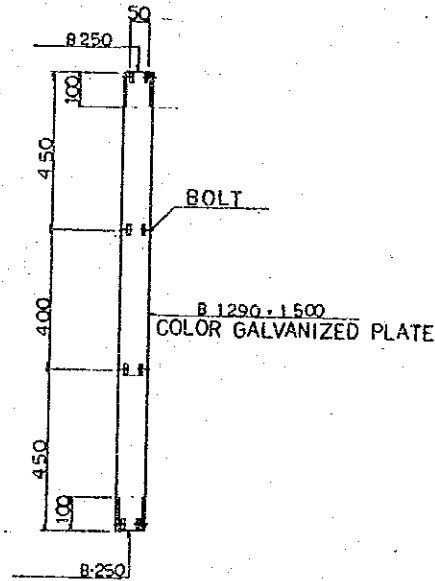
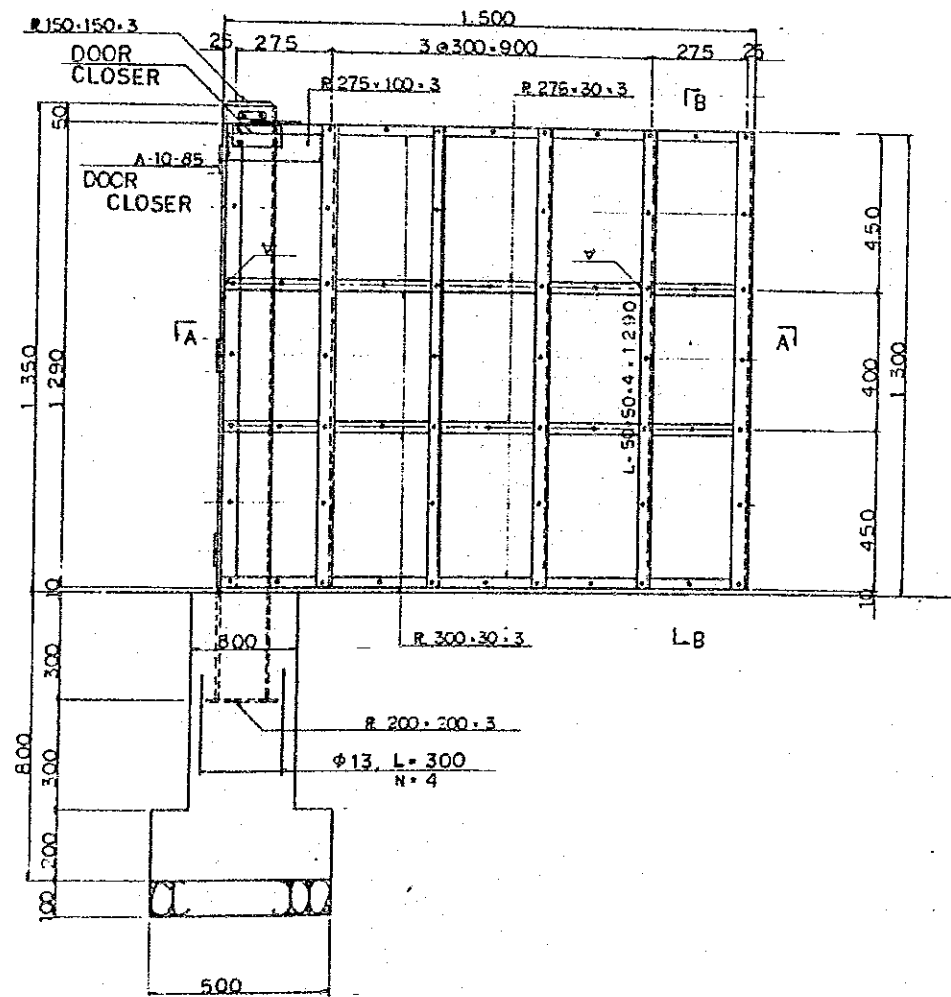
**SECTION**



**FRONT VIEW**

**SECTION B-B**

**FRONT VIEW**



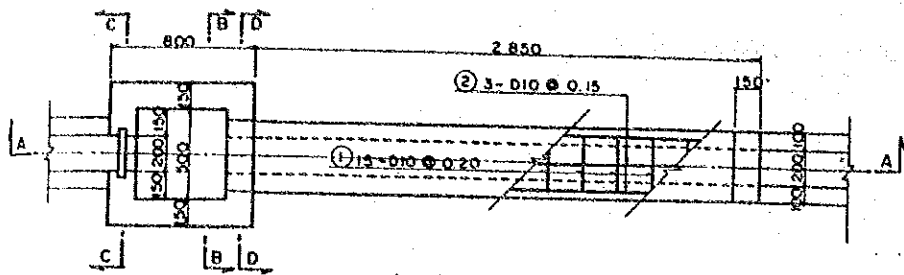
DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)  
JATISARI PESTS FORECASTING CENTER

**GATE STRUCTURE**

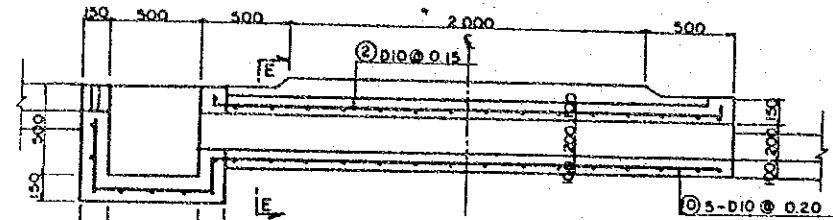
JAPAN INTERNATIONAL COOPERATION AGENCY  
T O K Y O

DWG. NO.  
**J-18**

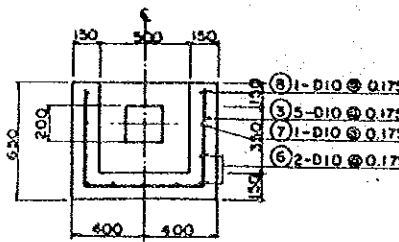
CULVERT PLAN S=1:20  
(IRRIGATION CANAL---DLINE,E'LINE)



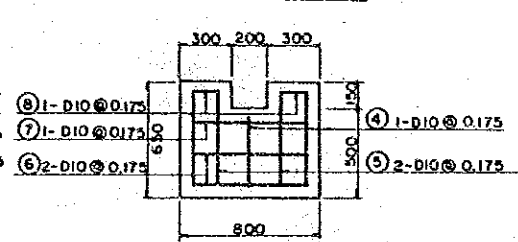
A-A SECTION S=1:20



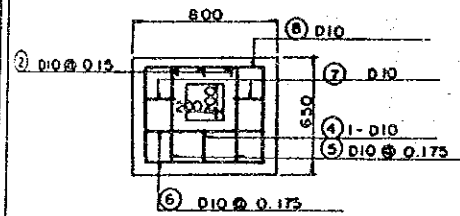
B-B SECTION S=1:20



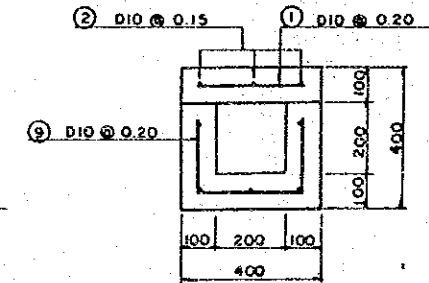
C-C SECTION S=1:20



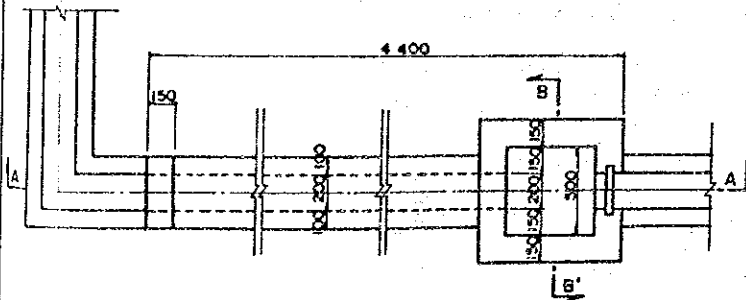
D-D SECTION S=1:20



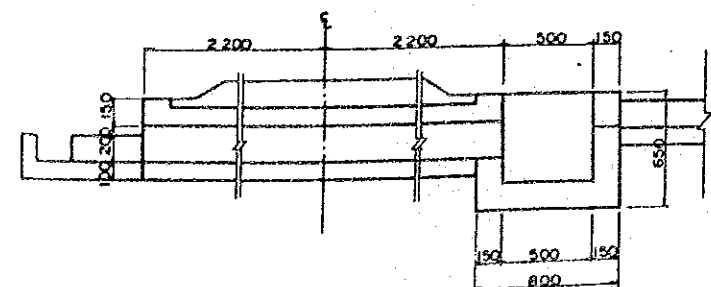
E-E SECTION S=1:10



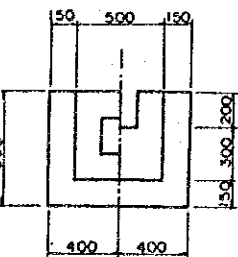
CULVERT PLAN S=1:20  
(IRRIGATION CANAL C-LINE)



A-A SECTION S=1:20

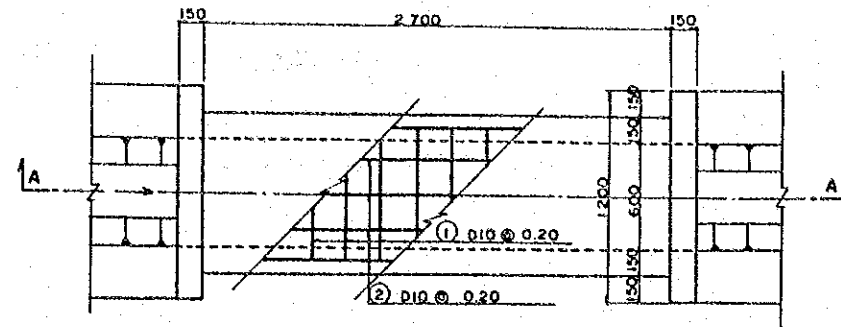


B-B' SECTION S=1:20

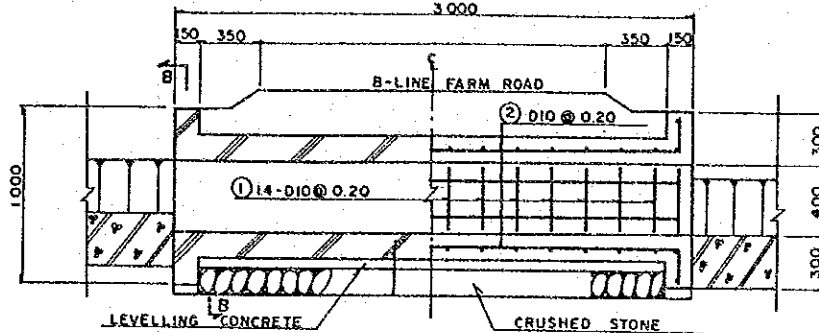


RELATED STRUCTURE

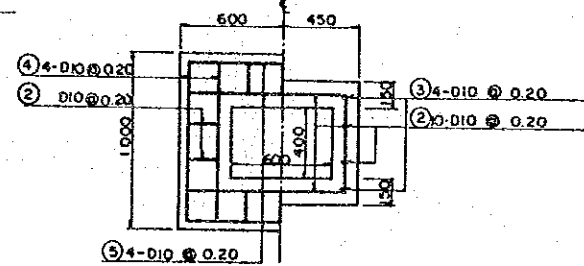
CULVERT PLAN (DRAINAGE CANAL E-LINE) 1:20



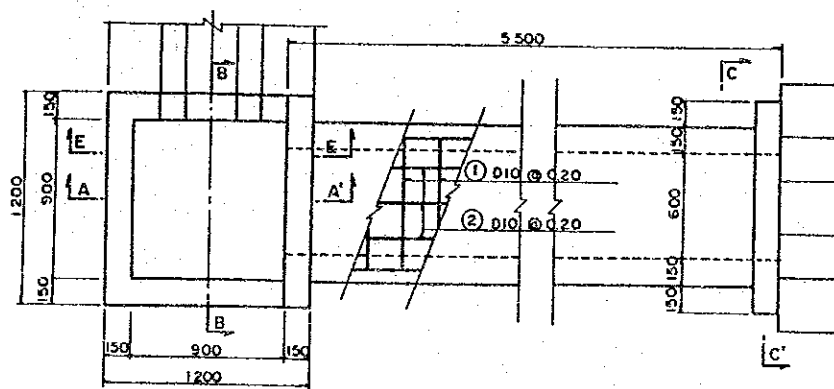
A A SECTION S=1:20



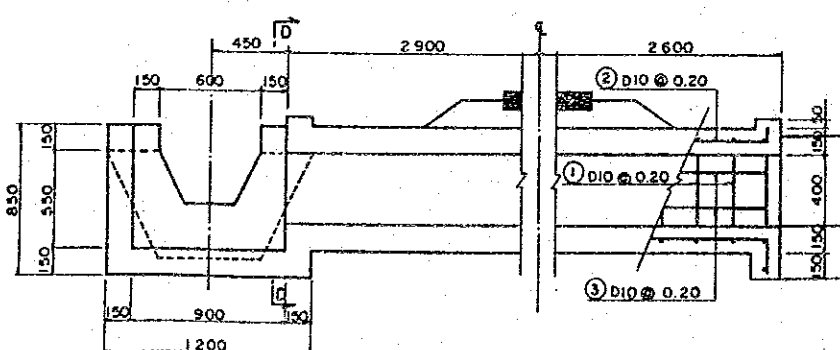
B-B SECTION S=1:20



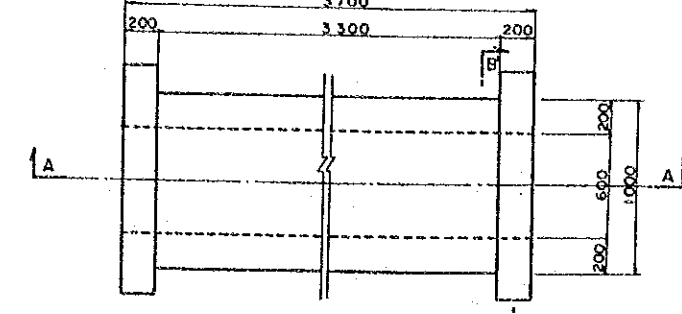
CULVERT PLAN S=1:20  
(DRAINAGE CANAL C-LINE)



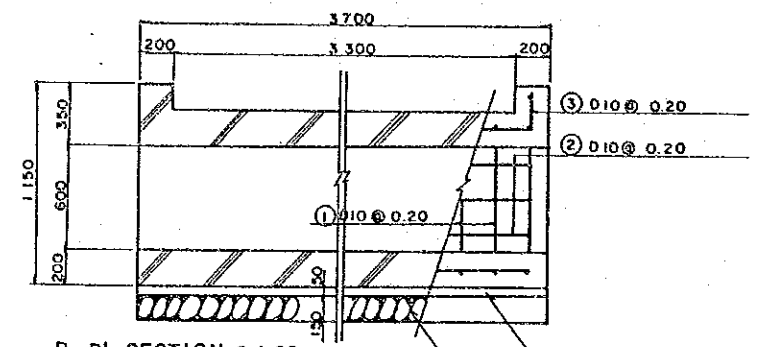
A-A SECTION S=1:20



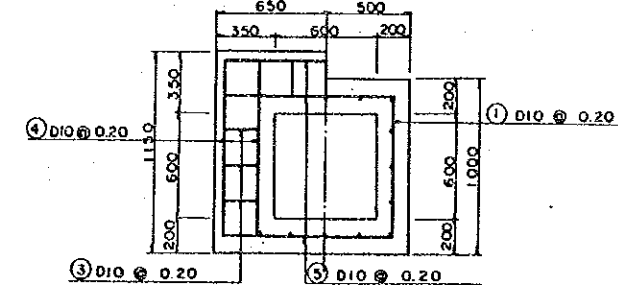
CULVERT PLAN (MAIN DRAINAGE CANAL)  
S=1:20



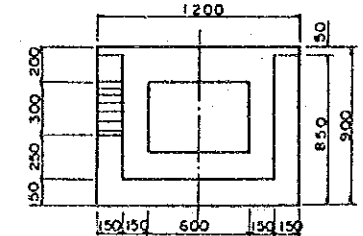
A-A SECTION S=1:20



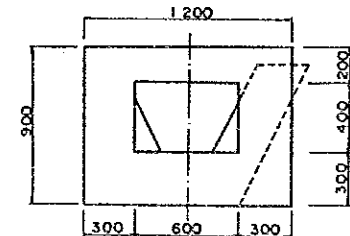
B-B' SECTION S=1:20



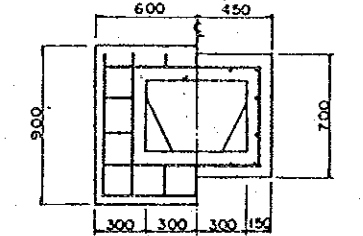
B-B SECTION S=1:20



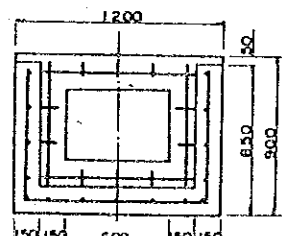
C-C SECTION S=1:20



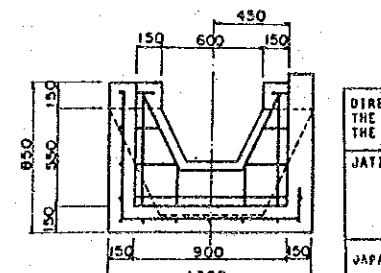
C-C' SECTION S=1:20



D-D SECTION S=1:20



E-E SECTION S=1:20



DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)

JATISARI PESTS FORECASTING CENTER

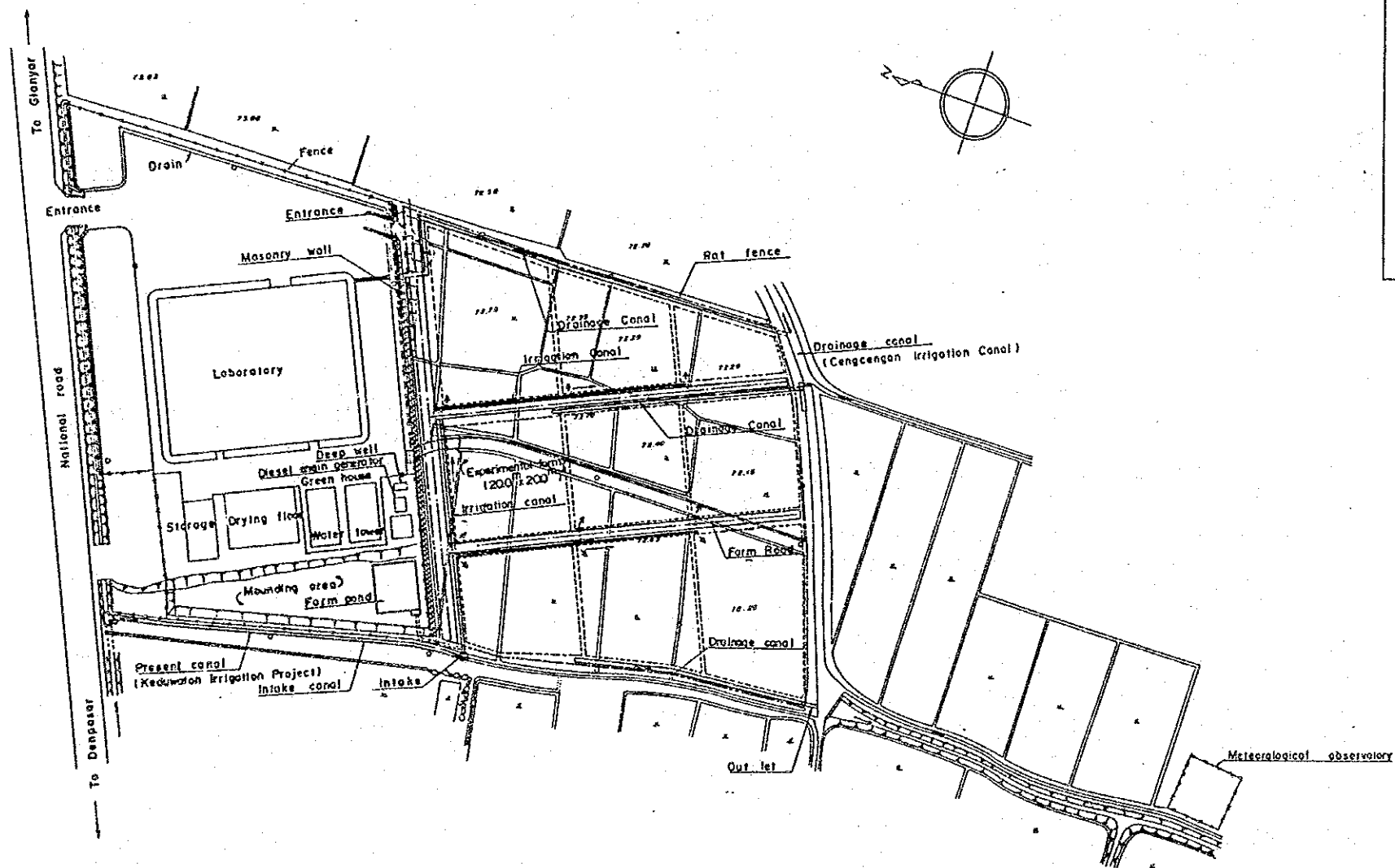
RELATED STRUCTURE

JAPAN INTERNATIONAL COOPERATION AGENCY  
T O K Y O

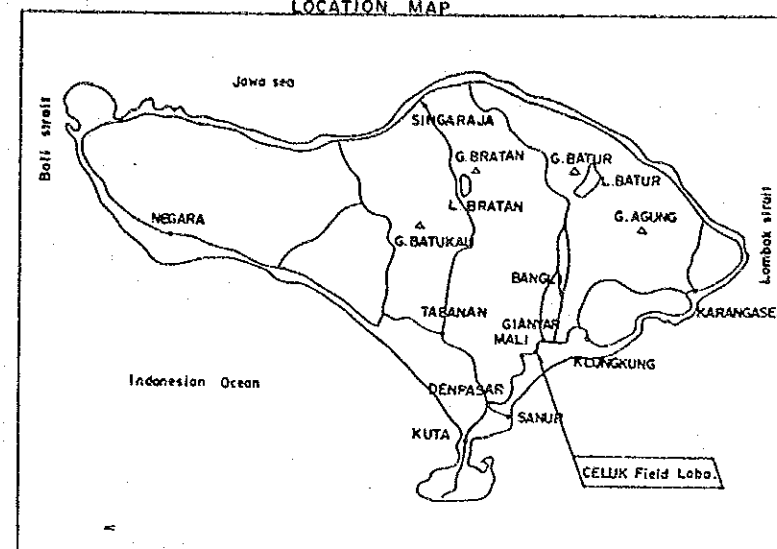
DWG. NO.  
J-19

# GENERAL PLAN OF CELUK FIELD LABORATORY

0 10 20m  
SCALE 1 : 500



LOCATION MAP



## THE INFRASTRUCTURE IMPROVEMENT WORKS FOR THE FOOD CROP PROTECTION PROJECT

1. LAND CONSOLIDATION WORK FOR PADDY FIELD
  1. Land shape adjustment & land levelling A=0.5 ha
  2. Irrigation canal/flume L=130 m
  3. Drainage canal/masonry L=230 m
  4. Farm road/gravel metaling
 

Type-A	B=2.5 m	L= 75 m
Type-B	B=1.5 m	L=125 m
  
2. INTAKE CANAL & FARM POND
  1. Intake canal/concrete lining L= 60 m
  2. Turnout box/concrete 1 place
  3. Farm pond/concrete 7.5x7.5x1.6 m V= 60 m<sup>3</sup>
  
3. INSTALLATION OF RAT FENCE WITH AUTOMATIC DOOR
 

H= 1.5 m	L= 275 m
----------	----------
  
4. OTHER RELATED STRUCTURES
  1. Access road & entrance 1 place
  2. Masonry wall H= 1.8 m L= 77 m
  3. Repairment of existing fence 1 L.S.
  4. Mounding work V= 500 m<sup>3</sup>

DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)

CELUK FIELD LABORATORY

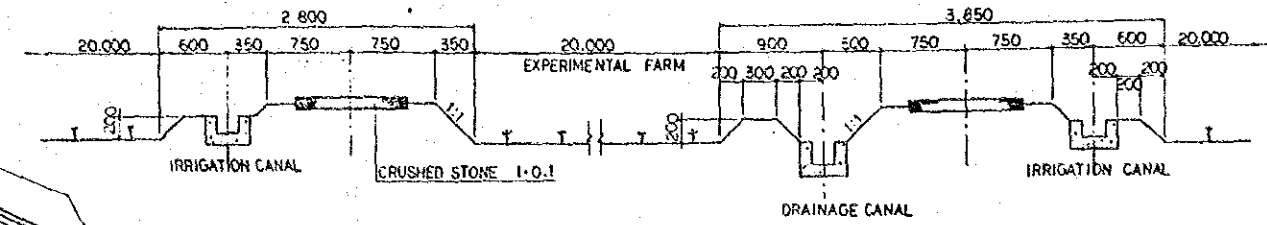
### GENERAL PLAN

JAPAN INTERNATIONAL COOPERATION AGENCY  
TOKYO

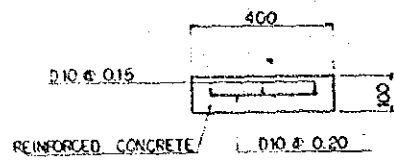
DWG. NO.  
C-1



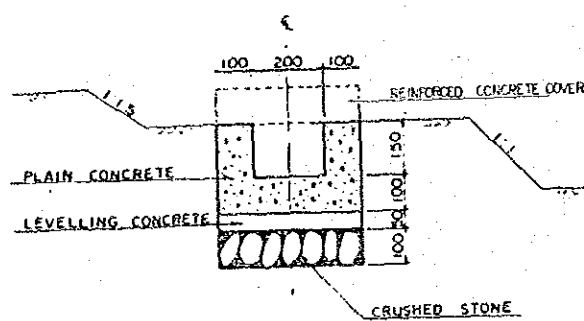
A-A SECTION S=1:30



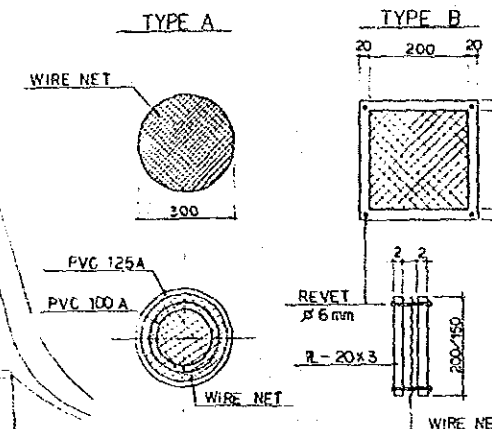
DETAIL OF REINFORCED CONCRETE COVER S=1:10



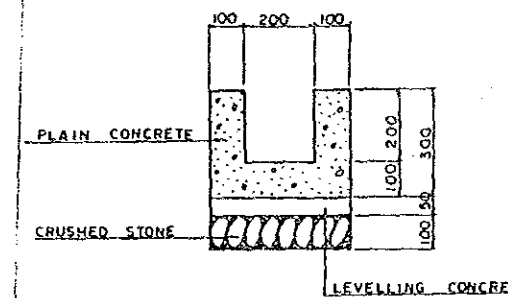
TYPICAL CROSS SECTION S=1:10 (IRRIGATION CANAL)



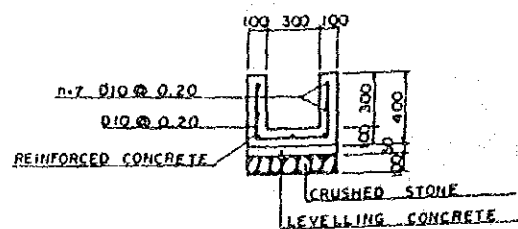
DETAIL OF RAT SCREEN



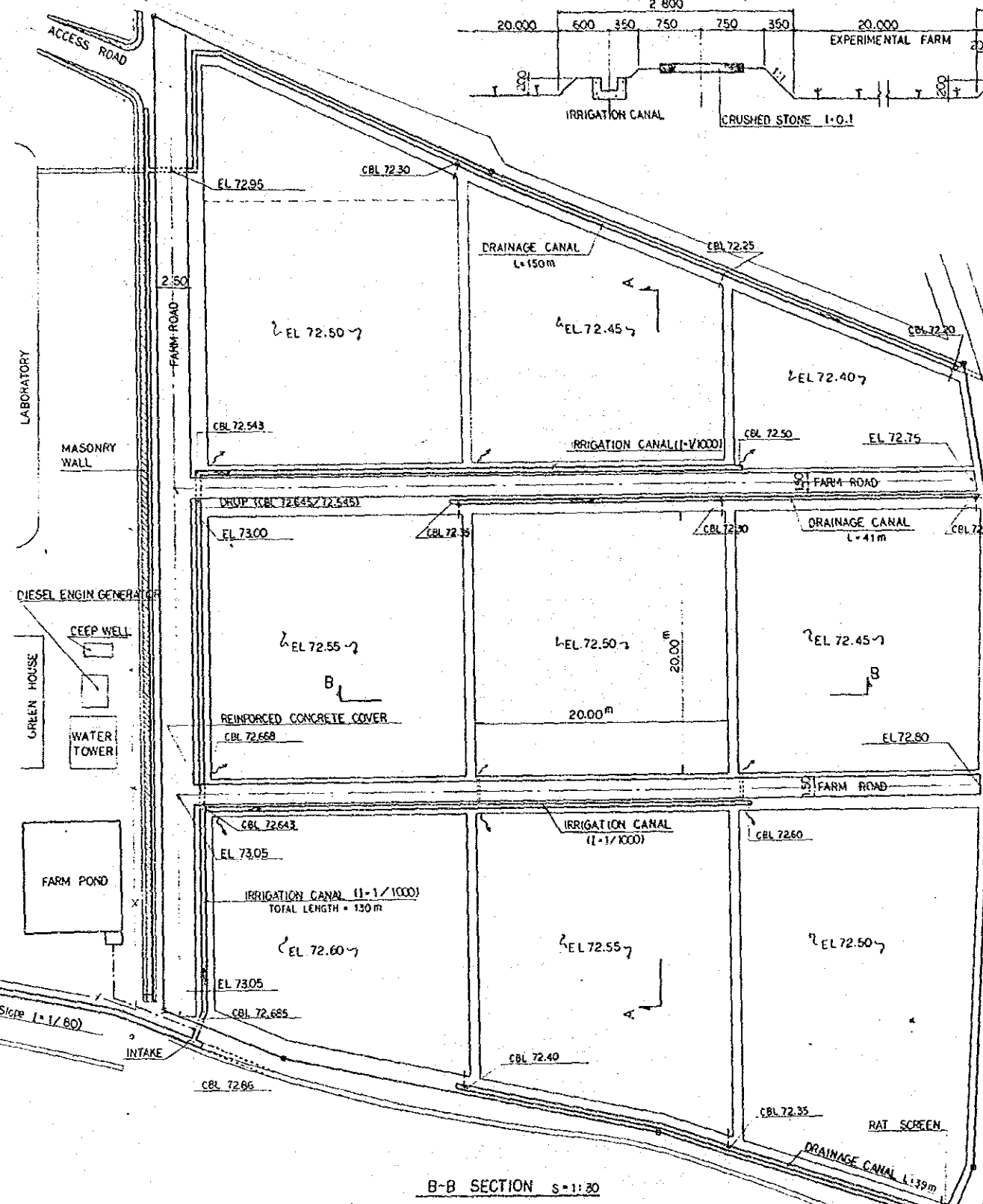
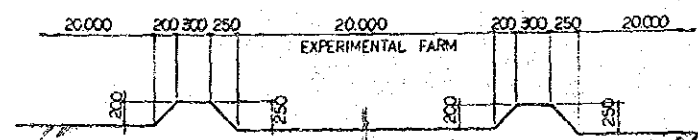
TYPICAL SECTION S=1:10 (DRAINAGE CANAL)



TYPICAL SECTION S=1:20 (INTAKE CANAL)

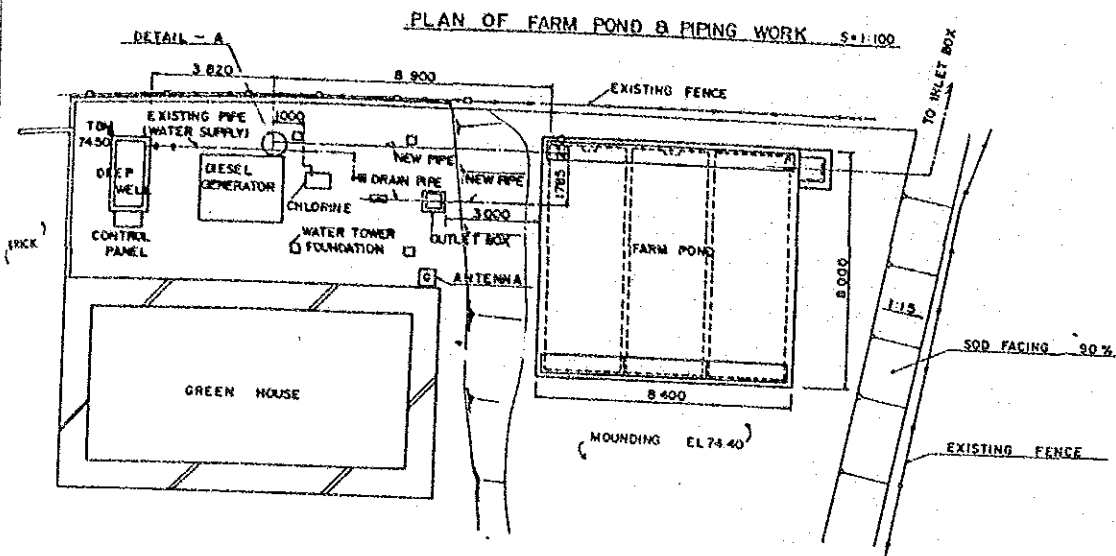


B-B SECTION S=1:30

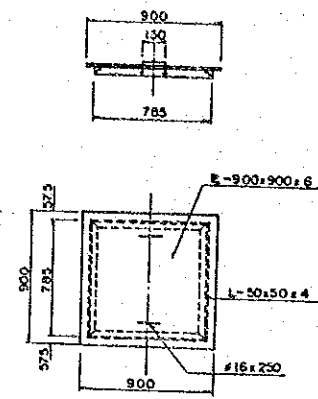


DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
 THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
 THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)  
 CELUK FIELD LABORATORY  
**IRRIGATION and DRAINAGE CANAL**  
 JAPAN INTERNATIONAL COOPERATION AGENCY  
 I O K T O  
 DNG. NO. C-2

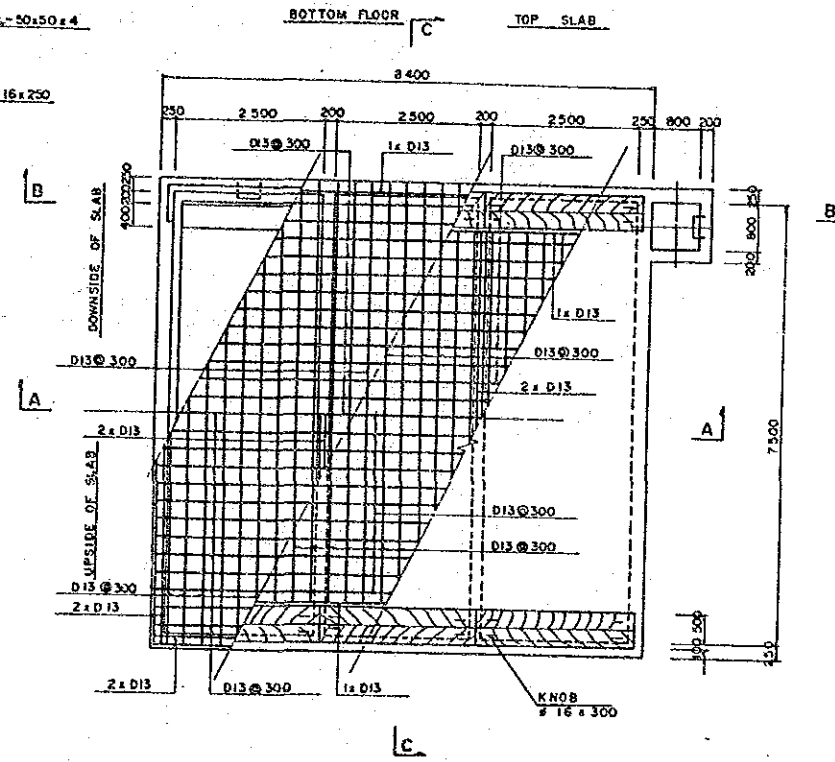




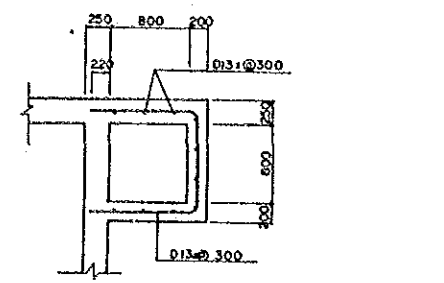
**DETAIL OF VALVE PIT COVER S=1:20**



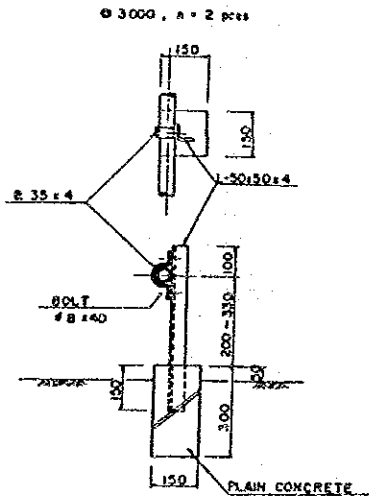
**PLAN OF FARM POND S=1:50**



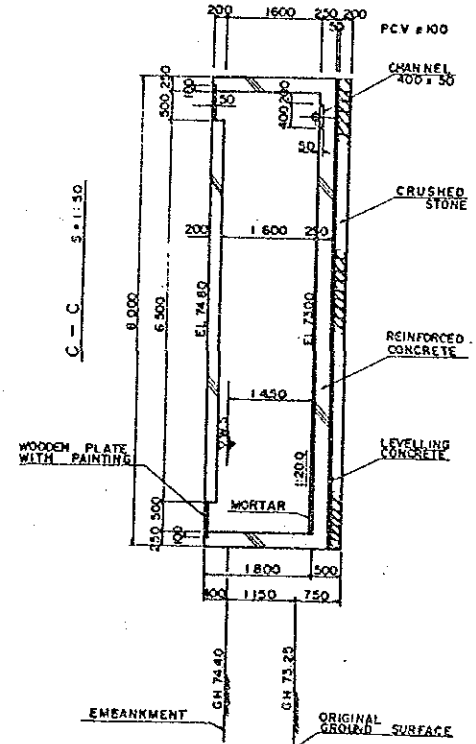
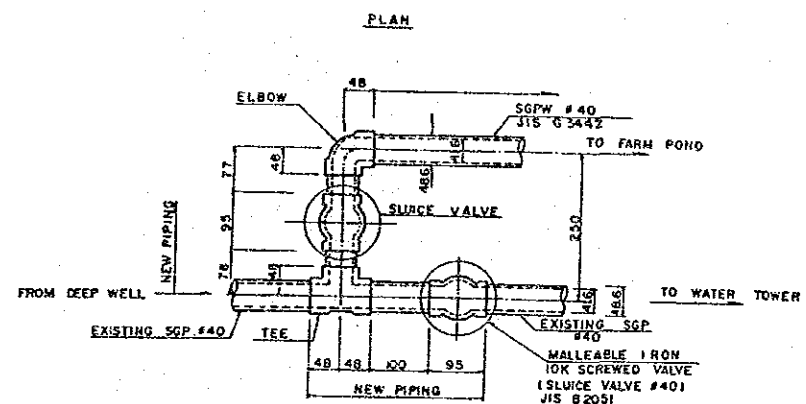
**PLAN OF VALVE PIT S=1:30**



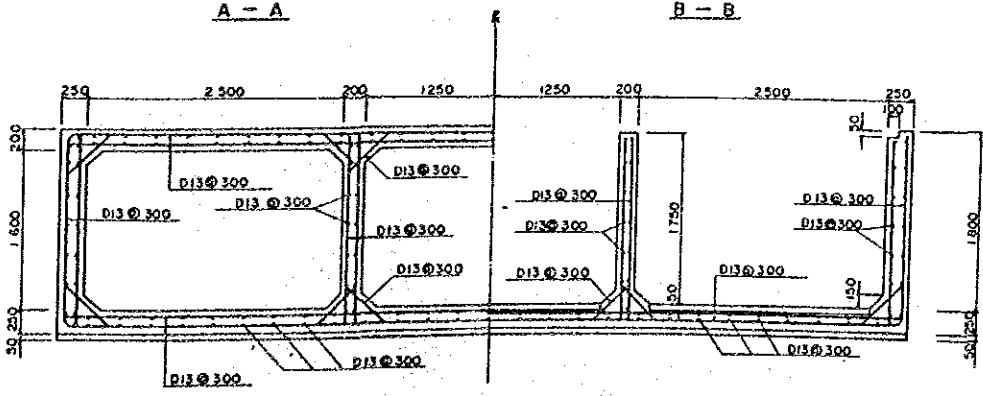
**DETAIL OF PIPE SUPPORT S=1:10**



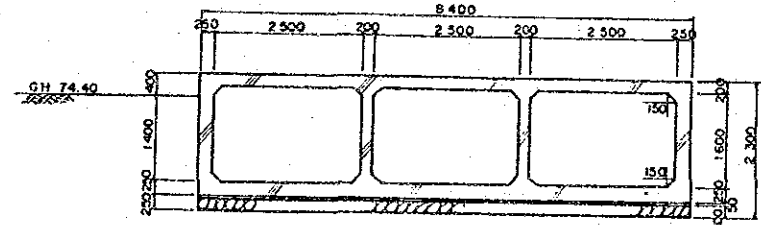
**DETAILS - A S=1:30**



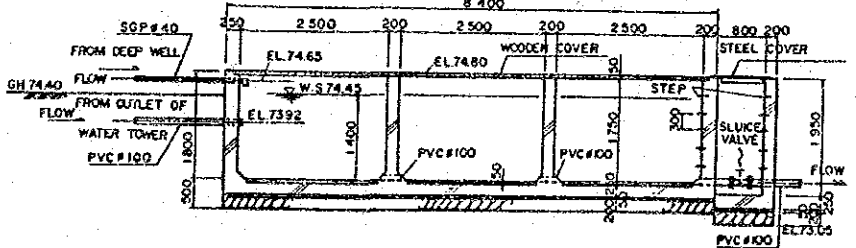
**REINFORCEMENT PATTERN S=1:30**



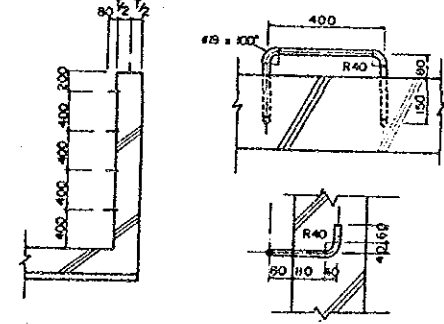
**A-A S=1:50**



**B-B S=1:50**

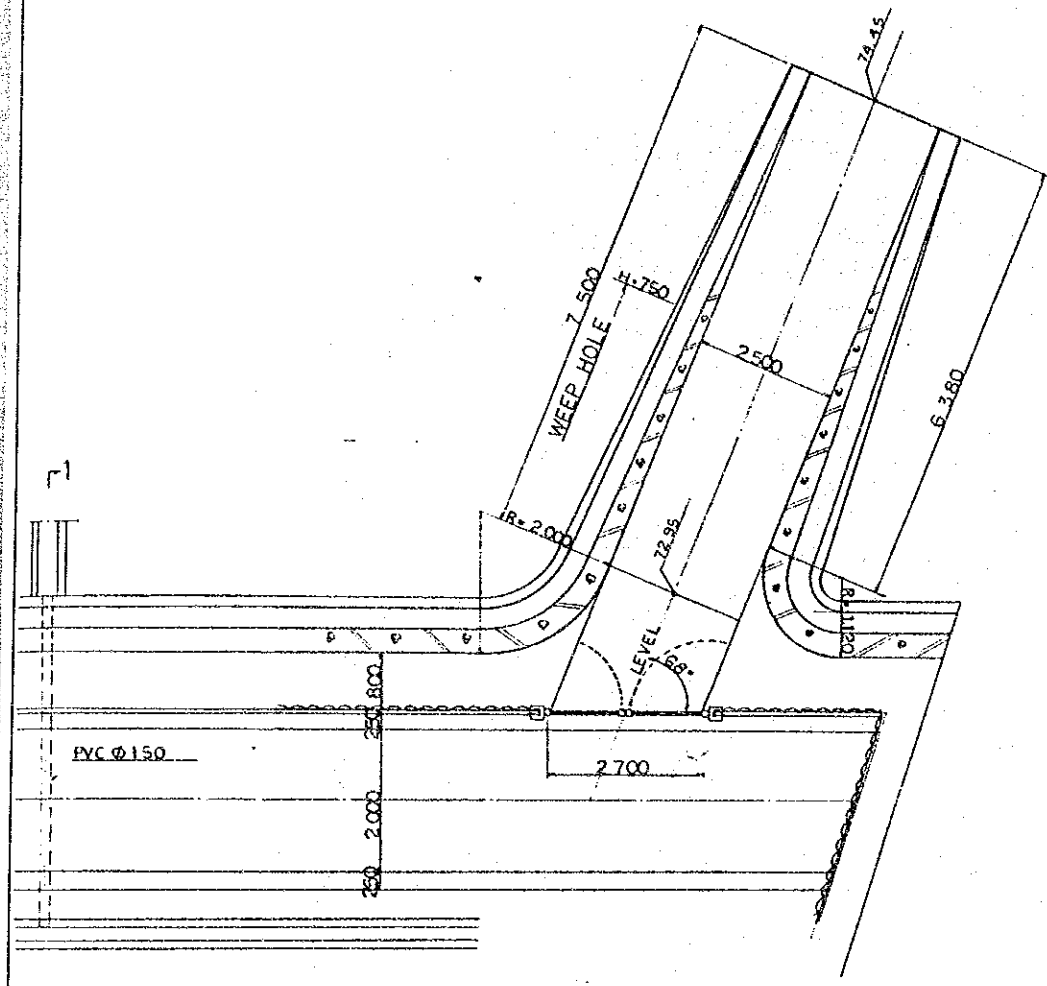


**DETAIL OF STEP (for 4 Places)**

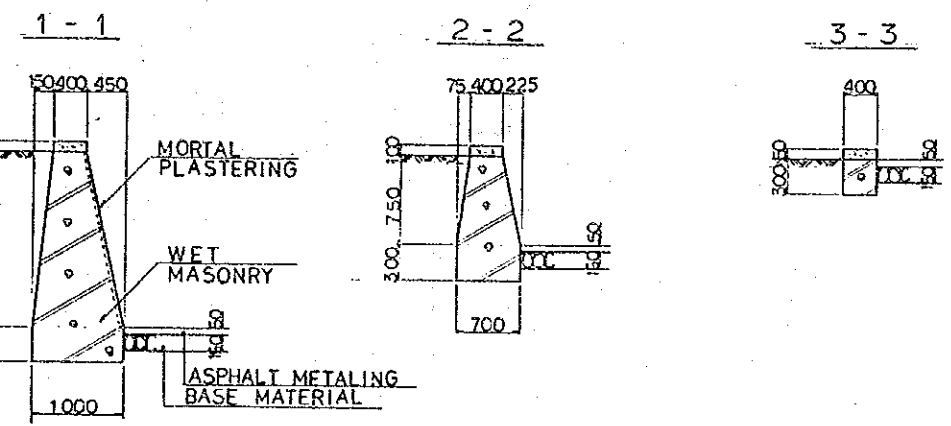
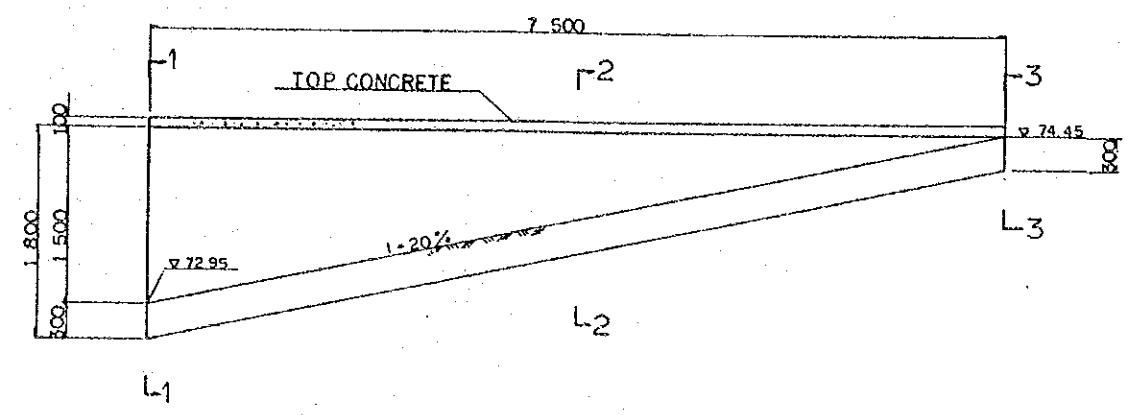


DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
 THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
 THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-192)  
 CELUK FIELD LABORATORY  
**FARM POND & PIPING WORK**  
 JAPAN INTERNATIONAL COOPERATION AGENCY  
 I.C.R.A.O.  
 Dwg. No. C-3

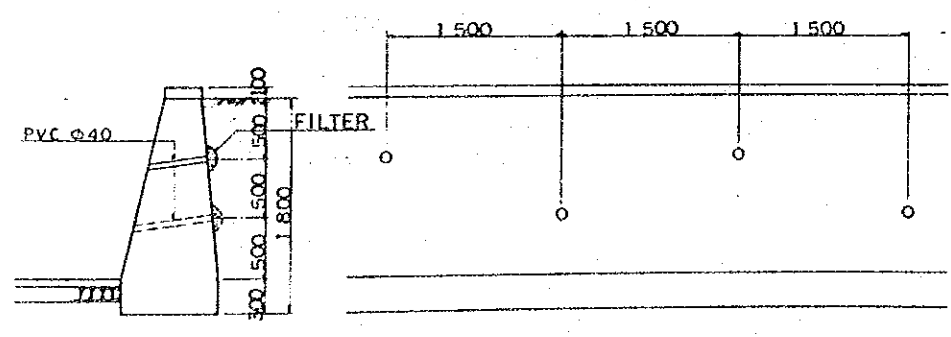
PLAN S=1:50



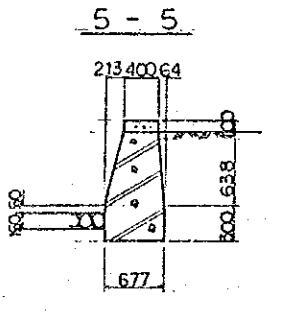
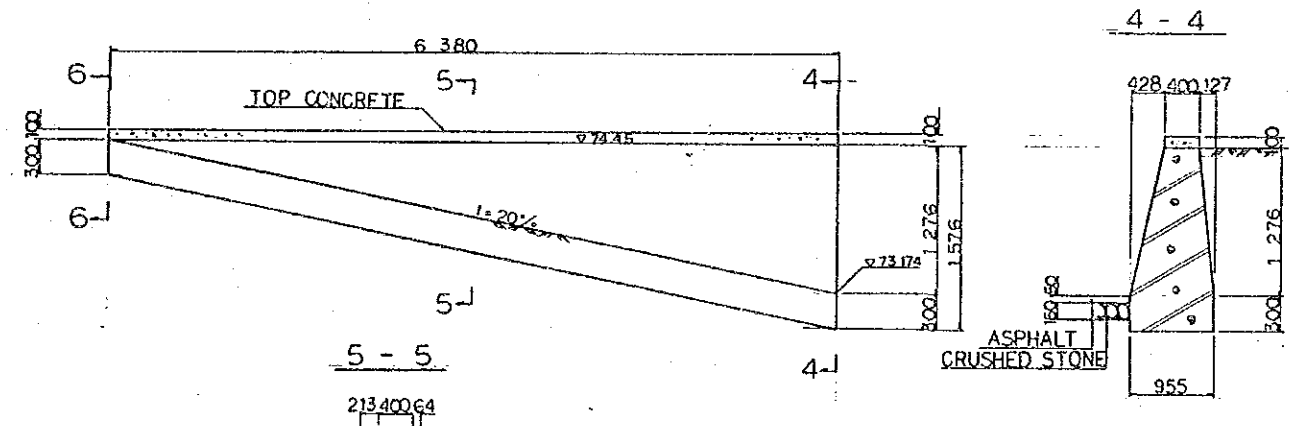
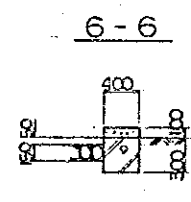
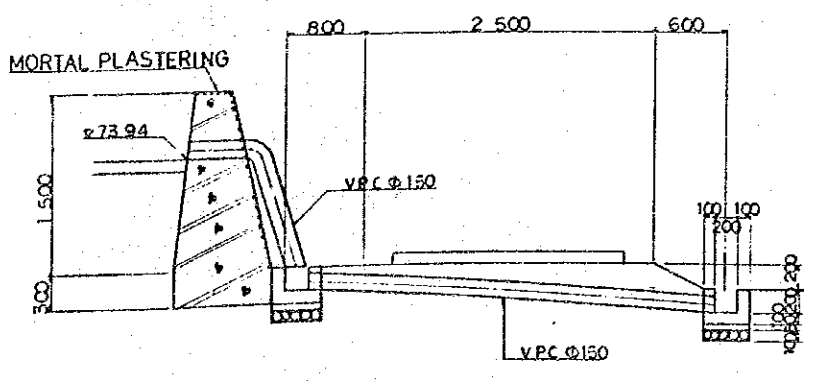
SIDE VIEW OF WALL S=1:30



WEEP HOLE S=1:30



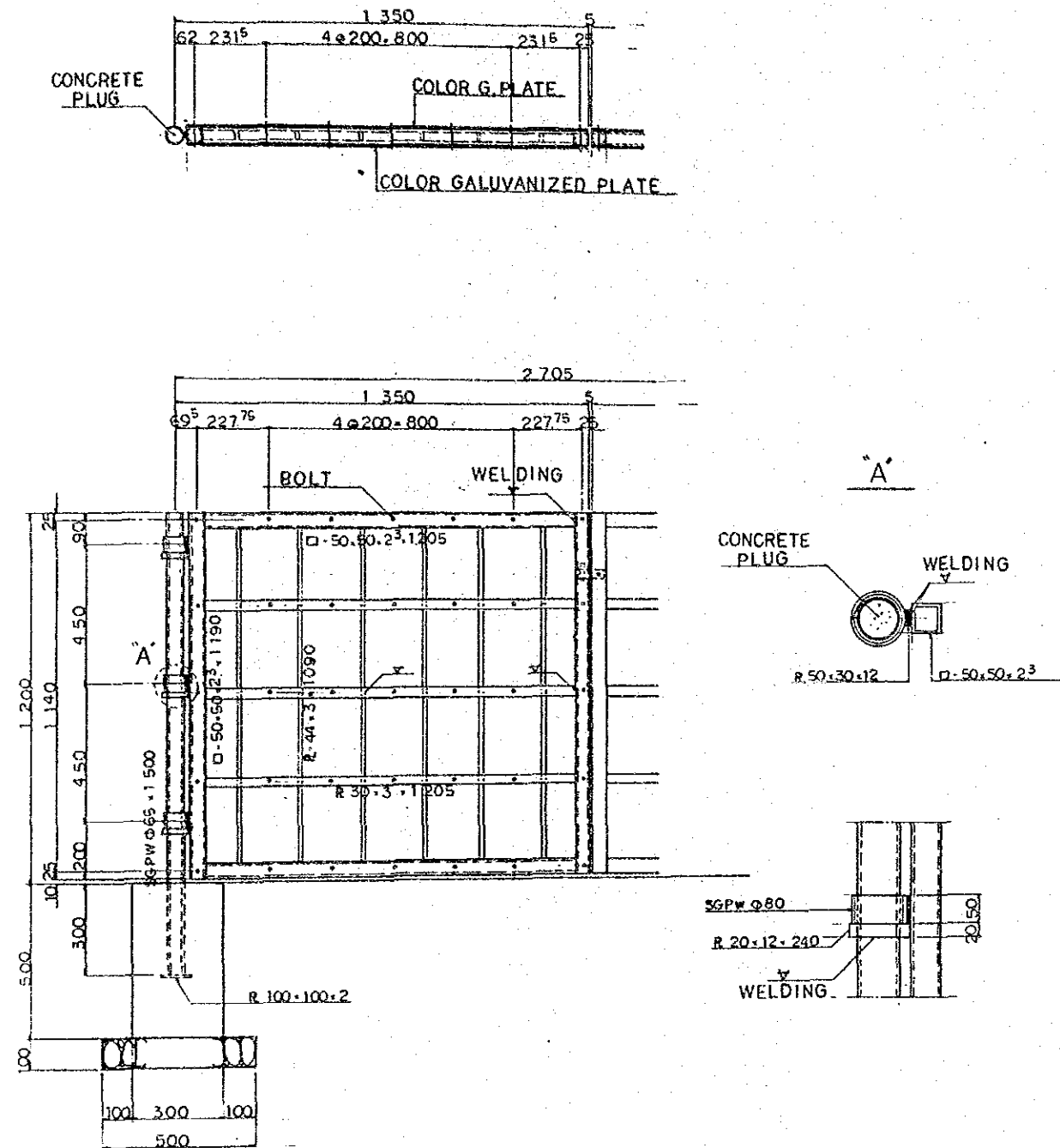
1-1 S=1:30



DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
 THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
 THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)  
 CELUK FIELD LABORATORY  
**MASONRY RETAINING WALL**  
 and ACCESS ROAD  
 JAPAN INTERNATIONAL COOPERATION AGENCY  
 TOKYO  
 DWS. NO.  
 C-4



DETAIL OF GATE



DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
 THE INFRASTRUCTURE IMPROVEMENT WORKS FOR  
 THE FOOD CROP PROTECTION PROJECT (2nd Phase of ATA-162)  
 CELUK FIELD LABORATORY

**GATE STRUCTURE**

JAPAN INTERNATIONAL COOPERATION AGENCY  
 TOKYO

DWG. NO.  
**C-6**



CHAPTER 7 DATA AVAILABLE

Member of Detailed Survey Team

The team consists of the following Japanese Experts and Indonesian Counterpart personnel for the Detailed Design Survey.

Japanese Team :

1. Team Leader                      Mr. Takamichi IWAI  
Chief Researcher, The Japanese  
Institute of Irrigation and  
Drainage (JIID)
  
2. Coordination                      MS. Michiko UMEZAKI  
Technical Cooperation Division,  
Agricultural                      Development  
Cooperation Department, (JICA)
  
3. Design of                          Mr. Yoshitami ISEKI  
Farmland                              Senior Engineer of Overseas  
Engineering Department, Japan  
Irrigation and Reclamation  
Consultants Co.,Ltd. (JIRCO)
  
4. Design of Irriga-                  Mr. Chikanori KUBOTA  
tion and drainage                      Overseas Engineering Department,  
Japan Irrigation and Reclamation  
Consultants Co.,Ltd. (JIRCO)

Indonesian Counterpart Personnel :

1. Coordination (Jakarta)          Mr. Yusumin M.Sc., Section of  
Invertebrate, Directorate of  
Food Crop Protection, (DFCP)



2. Coordination (Jatisari) Ir. Erma Budiyanto,  
Coordinator of Jatisari Pests  
Forecasting Center

3. Coordination (Celuk) Ir. I. Gusti N. Astika,  
Coordinator of Celuk Field  
Laboratory

## Main Activities of detailed Survey Team

The schedule of the activities of the survey team and authorities concerned are described as follows :

- Dec.18 - The survey team (Mr. T. Iwai team leader and two  
1987 members) arrived at Jakarta, and joined with a coordinator preceded.
- Dec.19 - Courtesy call on JICA office and Directorate General of Food Crop Agriculture, and Directorate of Food Crop Protection, Ministry of Agriculture.  
- After discussion on the survey schedule with Japanese Experts, three members of the team moved to Denpasar.
- Dec.20 - Visited the Bali 7th Protection Center  
- Reconnaissance survey with counterpart and Japanese expert
- Dec.21 - Reconnaissance survey on the Celuk Field Laboratory  
- Discharge observation.
- Dec.22 - Collected data at Bali Irrigation Project office.  
- Discussion about the facilities improved with counterpart and Japanese expert.  
- Move to Jakarta.
- Dec.23 - Reconnaissance survey on the Jatisari Pests Forecasting Center and discharge observation  
- Visited the Ciba-Geigy Research & Development Station  
- Team internal meeting.

- Dec.24 - Meeting at JICA
  - Making of Basic Plan
  - Arrangement of survey equipments
- Dec.25 - Data arrangement
  - Making of attached drawings
- Dec.26 - Meeting for explanation of the Basic Plan with the Director General of Food Crop Agriculture and Director of Food Crop Protection, and submitting of the Report on the Basic Plan
  - Explanation about the procedure of Model Infrastructure Improvement Works to official concerned
  - Two members of the Team, the team leader and coordinator left for Tokyo
- Dec.27 - Field Investigation, field work and data collection at the Jatisari site were continued by two members of the Team
- Dec.28 - Moved to Jatisari
  - Field survey, topographic survey, data collection and preliminary design
- Dec.31 - ditto-
  - Moved to Jakarta
- Jan.1 1988 - Data arrangement
- Jan.2 - Data arrangement, reservation of airticket
  - Move to Jatisari
- Jan.3 - Topographic survey at Jatisari
- Jan.6 - ditto-

- Jan.7 - One member of the Team visited a pump maker in Jakarta
- The above member returned to Jatisari
  
- Jan.8 - Topographic survey
- Discharge observation
  
- Jan.9 - Field survey, visited Ciba-Geigy farm
- Visited the Jatiluhur dam site
  
- Jan.10 - Moved to Denpasar from Jatisari
- Meeting with officials concerned and Japanese expert
  
- Jan.11 - Field survey, topographic survey, data collection and preliminary design at Celuk.
- {
- Jan.19 - ditto-
- Move to Jakarta
  
- Jan.20 - Explanation about the field survey results to the Japanese experts.
- Preliminary design for the both places
- Survey equipments were returned to the Directorate of Food Crop Protection
  
- Jan.21 - Preliminary design for the both places
  
- Jan.22 - Report making
  
- Jan.23 - Report making
  
- Jan.24 - Making of attached drawings

Jan.25 - Submitting of the Field Report to the  
Directorate General of Food Crop Agriculture,  
Ministry of Agriculture  
- Report to Japanese Embassy and the JICA office  
- Two members of the detailed design survey team  
are scheduled to leave for Japan

Jan.26 - Arrive in Tokyo

LIST OF PERSONNEL CONCERNED

Directorate General of Food Crop Agriculture

Dr. Ir. A. MUIN PABINRU      Director General of Food Crop  
Agriculture, Ministry of  
Agriculture

Directorate of Food Crop Protection

Dr. M. HAERUDDIN TASLIM      Director of Food Crop  
Protection,  
Directorate General of Food Crop  
Agriculture

Ir. CANDRA KIRANA      Vice Director of Food Crop  
Protection

Ir. SUROTO      Chief of Sub Directorate of  
Weed and Disease

Mr. YUSMIN MSC      Counterpart in Jakarta ;  
Chief of Invertebrate Section,  
Sub Directorate of Observa-  
tion and Forecast

Mr. MEMET      Staff of Food Crop Protection

Mr. SUGANDA      - ditto -

Jatisari Pest Forecasting Center

Ir. Erma Budiyanto      Counterpart in Jatisari ;  
Coordinator of Pest  
Forecasting Center, Jatisari

Mr. JOKO PRIYONO      Coordinator of Vertebrate  
Laboratory, Jatisari

Mr. NYOMAN RAGA      Coordinator of Plant Pathology,  
Jatisari

Mr. KADAR SURATIYO      Chief of Administration, Jatisari  
Pest Forecasting Center

Bali The 7th Crop Protection Center

Ir. FIRMAN BUTAR      Chief of the 7th Crop  
Protection Center, Denpasar

Ir. ARYA	Chief of Administration, the 7th Crop Protection Center, Denpasar
Mr. WAGA	Staff of the 7th Crop Pro- tection Center, Denpasar
Bali, Celuk Field Laboratory	
Ir. I. GUSTI NGURAH ASTIKA	Counterpart in Celuk ; Coodinator of Celuk Field Laboratory
Ir. I. NENGAH SUWELA	Staff of Celuk Field Laboratory
Ir. I. GST NGURAH ARYAWAN	- ditto -
Ir. I. NYM. SUTA ASTIKA	- ditto -
Bari, Regional Agricultural Office	
Mr. OKA	Representative of Regional Agricultural office, Denpasar
Tarum Timur Main Canal O & M Office	
Mr. SUEB SUYADI S.T.M	Chief of Tarum Timur Main Canal O & M office, Jatisari
Rural Extention Center	
Mr. ADE.AH.ZUL KARNAEN	Chief of Rural Extention Center Jatisari, Karawan
Pangulah Utara Village	
Mr. WADI N. SUNARDI	Chief of Pangulah Utara Village, Jatisari
Bari Irrigation Sector Project	
Ir. J.HERU MARSUDI DIP.HE	Deputy Project Manager of Bari Irrigation Sector Project, Denpasar
Ms. HERNING WIDAYAH M. ENG.	Chief of Bali Irrigation Sector Project, Denpasar



Celeg Farmer's Association

Mr. WAYAN KACIRAN

Chief of Farmer's Association

Celeg, Bari

Mr. WAYAN JELEG

Staff of Farmer's Association

Celeg, Bari

Maker's etc.

Mr. H. SHIMOMURA

Manager of EBARA Corporation,  
Jakarta office

Ir. SANUSI SIDI

General Manager of P.T.  
PALMAS ENTRACO, Jakarta

Ir. FIDENSIUS GUNAWAN

Staff of Engineering  
Architect Consultant

Mr. DEDE WASLAM

- ditto -

Embassy of Japan

Mr. Shoji Suzuki

First Secretary

JICA Indonesia Office

Mr. Yasuo Kitano

Resident Representative

Mr. Mikiharu Sato

Deputy Resident  
Representative

Mr. Manabu Aiba

Assistant Resident  
Representative

Japanese Expert of Food Crop Protection Project

Mr. Socho Nasu

Team Leader

Mr. Yoshito Suzuki

Expert

Mr. Shizuo Mogi

Expert

Mr. Yuichi Sawada  
Expert/coordinator

Ministry of Agriculture

Mr. Etsuro Kagai  
Colombo Plan Expert,  
Directorate General of  
Food Crop Agriculture

Mr. Akihiko Kubota  
Colombo Plan Expert,  
Directorate General of  
Food Crop Agriculture

Directorate General of Water Resources  
Development, Ministry of Public Works

Mr. Katsuhiko Kimura  
Directorate of Planning,  
and Programming  
Team Leader

Mr. Yoshimi Dokyu  
Colombo Plan Expert,  
Directorate of Irrigation-  
I

Letter of Team Leader

JAPAN INTERNATIONAL COOPERATION AGENCY  
(JICA)  
DETAIL DESIGN SURVEY TEAM  
FOR  
THE FOOD CROP PROTECTION PROJECT (THE SECOND PHASE OF ATA-162)

26th December 1987

Dr. Ir. A. Muin Pabinru  
Director General of Food Crop  
Agriculture, Ministry of Agriculture

Dear Sir,

Re: The infrastructure improvement work for the Food Crop  
Protection Project (the second phase of ATA-162)

We, the Detail Design Survey Team, have been organized by JICA for the purpose of promoting infrastructure improvement work which is as stipulated in the clause IV of the Attached Document to the Record of Discussions between the authorities concerned of the Government of Japan and the Government of the Republic of Indonesia on the Japanese Technical Cooperation for the Food Crop Protection Project (the second phase of ATA-162) signed on February 17th, 1987.

The Team has, so far, made a series of site reconnaissances and discussions with your staff concerned in order to fix and determine the scales and sizes of expected facilities:

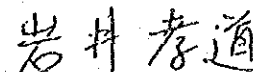
We would like to hereby confirm the matters which were mutually understood and agreed through discussions and site reconnaissances as per the attachment.

In accordance with above confirmed items, we will proceed with your staff to further field surveys and investigations at the site and to make the detail design on the basis of the result of those surveys. After the completion of detail design and assessment of its costs estimated by JICA, you will be informed its result through the JICA Indonesia office.

Further, for the timely commencement of the construction we would like to request you to take the necessary formalities in due consultation with the JICA Indonesia office.

Lastly, we would like to appreciate for kind cooperation of your staff during our stay.

Sincerely Yours,



Takamichi Iwai  
Team Leader

cc: Director of Food Crop Protection  
cc: Embassy of JAPAN

Basic Plan

ATTACHMENT

DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE  
MINISTRY OF AGRICULTURE  
THE REPUBLIC OF INDONESIA

BASIC PLAN ON THE INFRASTRUCTURE IMPROVEMENT WORK

FOR

THE FOOD CROP PROTECTION PROJECT

(THE SECOND PHASE OF ATA-162)

December 26, 1987

THE DETAILED DESIGN SURVEY TEAM  
JAPAN INTERNATIONAL COOPERATION AGENCY

## CONTENT

- I. Introduction
- II. Jatisari Pests Forecasting Center
  - 1. Irrigation facilities
  - 2. Others
- III. Celuk Field Laboratory
  - 1. Irrigation facilities
  - 2. Others

### Table & Figures :

- Fig-1 Location Map of Project Site
- Fig-2 Plan of Jatisari Pests Forecasting Center
- Fig-3 Plan of Celuk Field Laboratory
  
- Table-1 Outline of the Schedule on Project for Infrastructure Improvement Work
- Table-2 Members List of the Team
- Table-3 Tentative Itinerary of the Team

## I. INTRODUCTION

The Detailed Design Survey Team has decided the basic plan as follows based on field reconnaissance survey.

However, some of the items below may be changed after detailed survey.

## II. JATISARI PESTS FORECASTING CENTER (EXPERIMENTAL FARM FOR RODENT)

### 1. Irrigation facilities

(1) An intake from existing irrigation canal will be located at the nearest point from the new experimental farm. Surplus water will be conveyed to the adjacent existing experimental farm and surrounding paddy fields.

(2) As irrigation water above mentioned might be unstable, a new well will be dug to supply approximately 200 liters per minute. Suitable scale of a farm pond will also be installed.

### 2. Others

(1) Total area of the new experimental farm is 2 hectares (200m x 100m) and the area is surrounded by the rat fence.

(2) The farm road in the experimental farm has enough scale for the vehicle to carry such experimental equipment as a telemeter.

- (3) Outline of approximate arrangement of farm road and canals is shown in the figure-2.

### III. CELUK FIELD LABORATORY (EXPERIMENTAL FARM FOR GREEN LEAF HOPPER & TUNGRO DISEASE)

#### 1. Irrigation facilities

An intake in the existing irrigation canal will be improved. A new farm pond (approximately 80 cubic meters) will be also installed to utilize the capacity of the existing deep well pump.

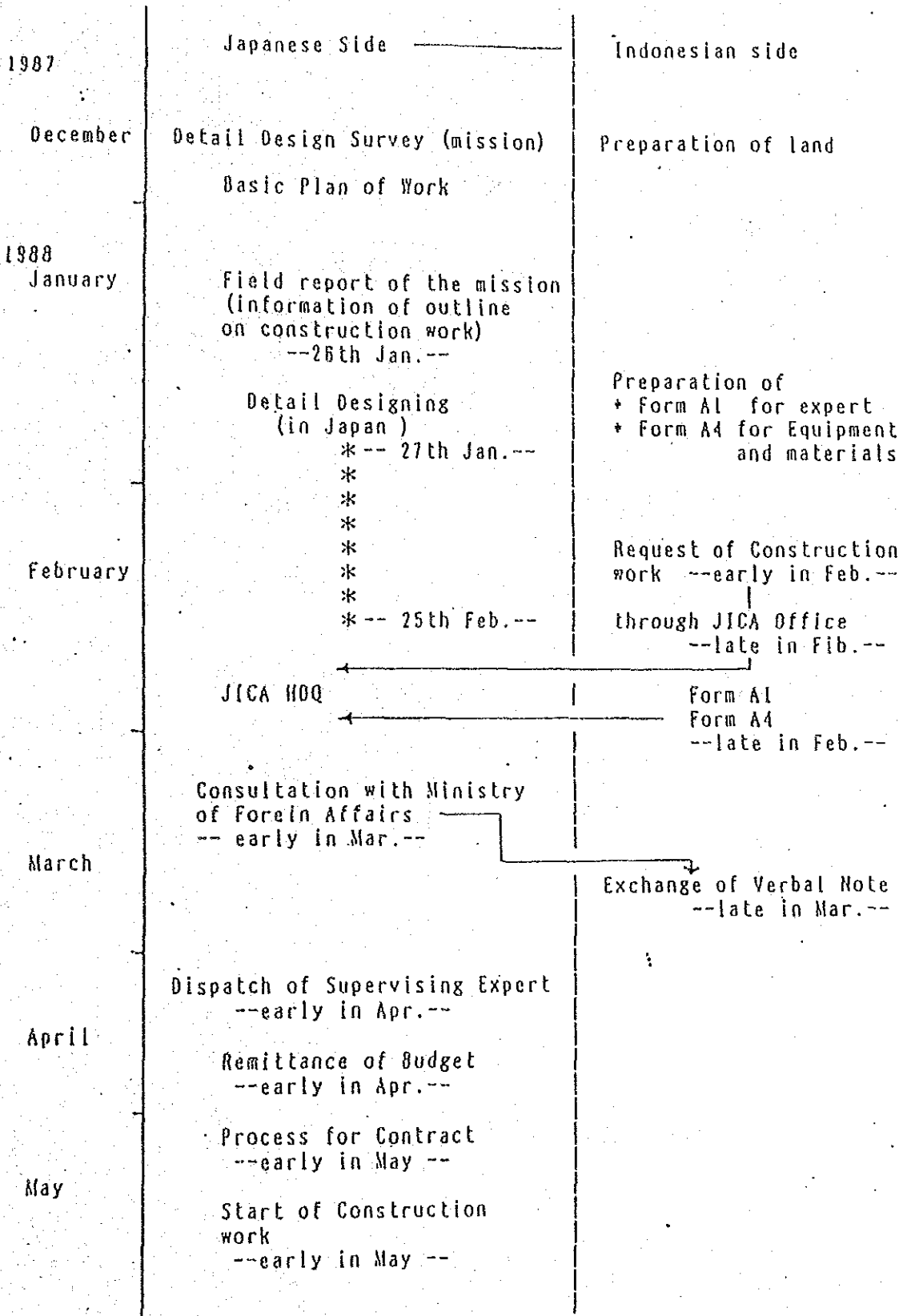
#### 2. Others

- (1) Total area is about 0.4 hectares, where the nine plots (20m x 20m) are made.
- (2) The access road is designed for a tractor to enter the experimental farm. But, the farm roads along the plots can be lessened up to the one-wheel-car scale.
- (3) The material and shape of the surrounding fence will be decided considering both rats proof and climatical conditions.
- (4) Outline of approximate arrangement of farm road and canals is shown in the figure-3.



Table-1

OUTLINE OF THE SCHEDULE ON PROJECT  
INFRASTRUCTURE IMPROVEMENT WORK



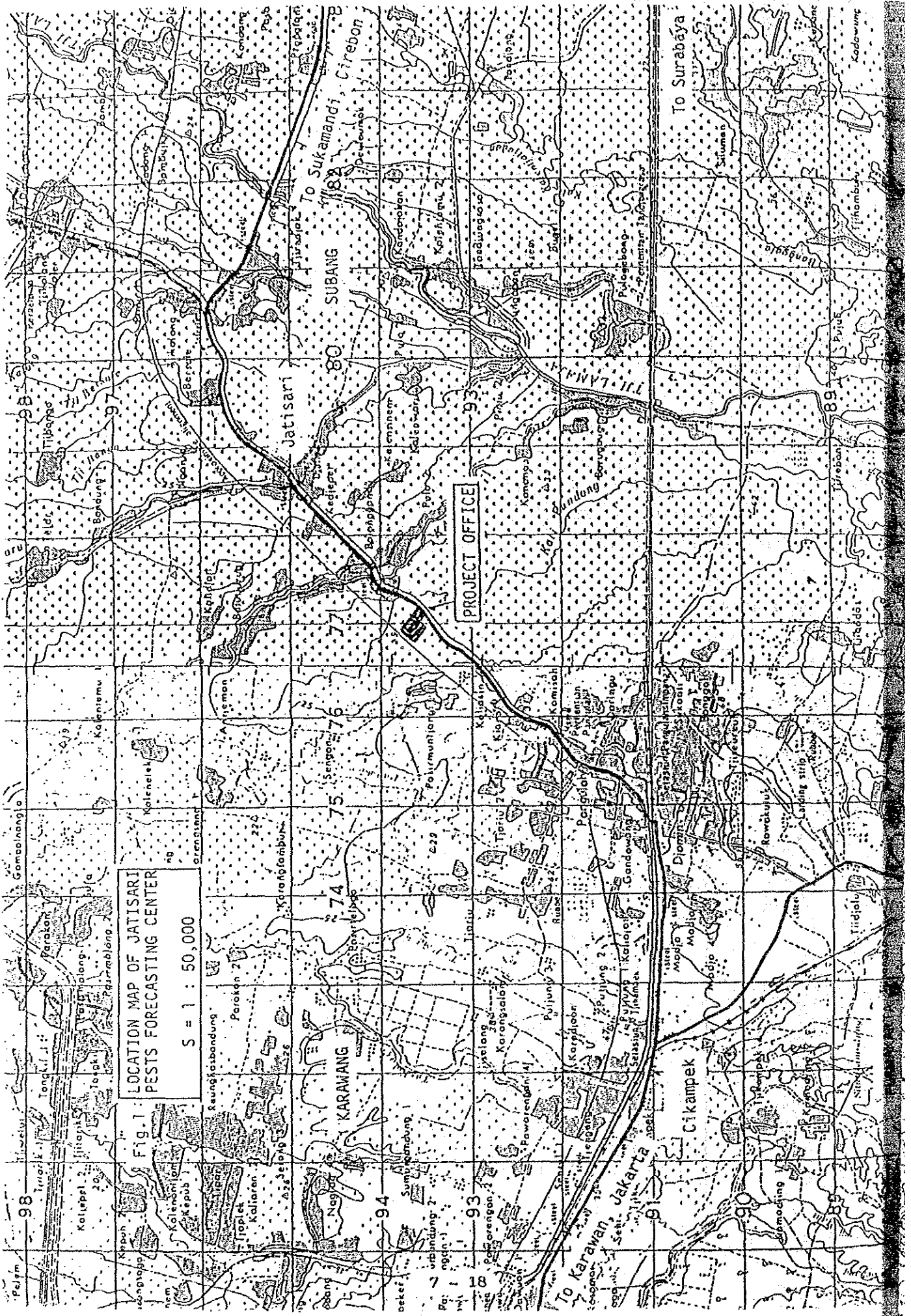
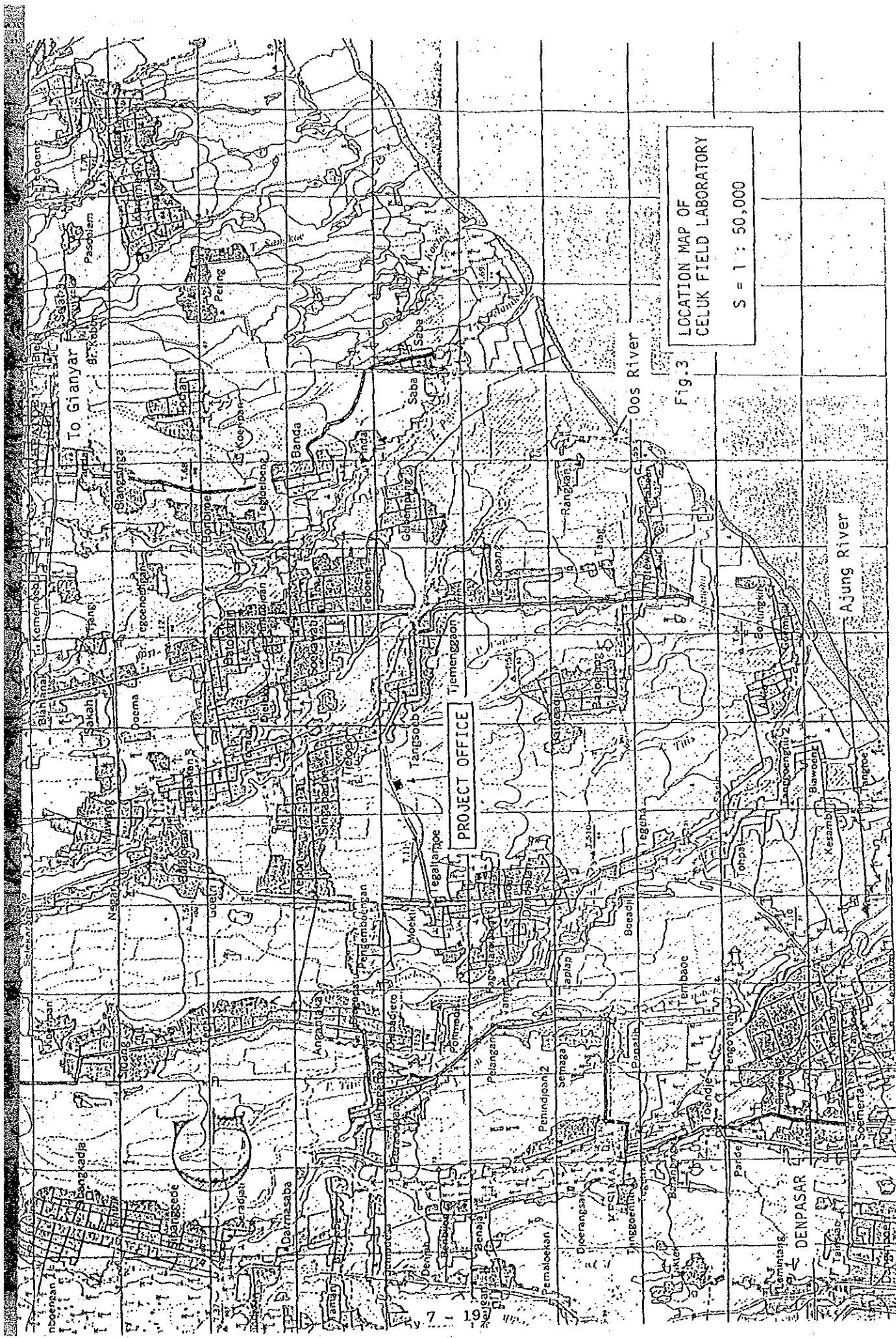


Fig. 1. LOCATION MAP OF JATISARI PESTS FORECASTING CENTER  
 S = 1 : 50,000



LOCATION MAP OF  
 CELUK FIELD LABORATORY  
 S = 1 : 50,000

Fig. 3

## List of Collected Data

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### Maps

MJ-1	Topographic map around Jatsiari (Copy) S = 1:50,000, HIND	3 sheets
MJ-2	- ditto - (Copy) S = 1:50,000, US ARMY MAP SERVICE	4 sheets
MJ-3	Topographic map of West Java S = 1:500,000	1 sheet
MC-1	Topographic map around Celuk (Copy) S = 1:50,000, HIND	2 sheets
MC-2	Map of Bali & Denpasar	1 sheet
MC-3	Topographic map of Bali S = 1:500,000	1 sheet
MC-4	Topographic map of Keduwatan (Copy) S = 1:50,000	1 sheet
MC-5	Administration map of Bali (Copy) S = 1:200,000	1 sheet
MC-6	Land use map of Bali (Copy) S = 1:200,000	1 sheet

### Hydrology and Meteorology

HJ-1	Monthly rainfall data at Jatisari 1960 - 1986	
HJ-2	Climeteorological data at Jatisari (daily) 1982 - 1986	
HC-1	Monthly rainfall data at Gianyar 1956 - 1978	
HC-2	Monthly rainfall data at Celuk 1971 - 1987	
HC-3	Climeteorological data at Denpasar (monthly) 1983 - 1985	
HC-4	Reconnaissance Hydrogeological Map, Bali S = 1:250,000, S = 1:200,000	
HC-5	Isohyetal Map, Bali (Copy) S = 1:200,000	

### Soil and Water Quality

- SO-1 Quaternary Geologic Map of the Bekasi  
S = 1:50,000
- SO-2 Geological Map of Bali (Copy)  
S = 1:200,000
- SO-3 Soil Map of Bali (Copy)  
S = 1:200,000
- SO-4 Report of Soil Investigation for the Pest and  
Disease Forecasting and Control Project  
(ATA 389), 1985
- SO-5 Drilling Profile at Celuk F.L
- W-1 Water Quality Test Result at Celuk F.L  
1987, Apr. 3

### Irrigation and Others

- IJ-1 Administration Map of Desa Pangulah Utara  
S = 1:2,500
- IJ-2 Unit Irrigation Water of Jatiluhur Project
- IJ-3 Structural Design Map of BTt18', Jatisari
- IJ-4 Irrigation System of Pundong Weir,  
S = 1:50,000
- IC-1 Schematic Map of Keduwatan Irrigation Project, Bali
- IC-2 Brief Report of Cengcengan Irrigation Project, Bali
- IC-3 Calculation of Unit Irrigation Water for Dukun  
Sub-Project; Bali
- O-1 Statistical Year Book 1985, 1986

### Center's Facilities

- CJ-1 Construction Drawings of Jatisari Center, 22 sheets
- CC-1 Specification of Pump Facilities of Celuk F.L.
- CC-2 Construction Drawings of Celuk F.L.

Cost, Material and Contractor's List

- CO-1 List of Construction Material Price and Wage at Jatisar Irrigation Office, 1987, Dec.
- CO-2 List of Construction Material Price and Wage at Denpasar, D.P.U, 1987, June
- CO-3 Example of Cost Estimation for Deep Well and Installation of Deep Well pump, Denpasar, 1986, Dec.
- CO-4 Contractor's List for Food Crop Protection Project

SURAT PERJANJIAN PEMINJAMAN TANAH  
SAWAH DALAM BENTUK KERJASAMA

Pada hari ini Sabtu tanggal dua puluh dua bulan Agustus Tahun seribu sembilan ratus delapan puluh tujuh, Kami yang bertanda tangan di bawah ini :

- Pihak KESATU : Kepala Dinas Pertanian Tanaman Pangan Propinsi Daerah Tingkat I Jawa Barat Cabang Dinas IV Purwakarta.
- Pihak KEDUA : Penanggung Jawab Sentra Perumahan Hama & Penyakit Tanaman Pangan Jatiasari.

Telah sepakat mengadakan perjanjian peminjaman tanah sawah dalam bentuk kerjasama tanpa adanya tekanan baik psykhis maupun fisik dengan ketentuan-ketentuan sebagai berikut :

P A S A L. I

U M U M

Pihak KESATU akan meminjamkan sebidang tanah sawah tersebut seluas 2 (dua) Ha kepada pihak KEDUA dalam rangka kerjasama dan pihak KEDUA menerima tanah sawah untuk dijadikan lokasi Studi dinamika populasi tikus serta berjanji akan mengembalikan tanah sawah tersebut kepada pihak KESATU apabila telah selesai batas waktu pinjaman yang telah ditentukan.

P A S A L. 2

Hak dan Kewajiban

1. Pihak KEDUA mempunyai hak untuk menggunakan tanah sawah tersebut untuk keperluan Studi dinamika populasi tikus.
2. Pihak KEDUA berkewajiban memberikan jasa atas pinjaman tanah sawah tersebut sebesar Rp 900.000,- (Sembilan ratus ribu rupiah) setiap tahun kepada pihak KESATU, yang akan dibayarkan setiap awal tahun pemakaian (bulan Oktober - Desember).
3. Pihak KEDUA mempunyai hak untuk mengubah/mengatur keadaan lapangan sesuai dengan kebutuhan teknis perubaaan.
4. Pihak KESATU tidak dapat mengalihkan hak dan penggunaan atas tanah tersebut kepada pihak lain selama masa perjanjian kerjasama belum selesai (5 tahun).
5. Pihak KEDUA berkewajiban memberikan informasi yang bermanfaat dari hasil temuan-temuan Studi dinamika populasi tikus tersebut kepada pihak KESATU.

P A S A L. 3  
P E M B A T A L A N

Pembatalan Surat perjanjian ini dapat dilakukan oleh pihak KESATU :

1. Apabila ternyata pihak KEDUA tidak dapat mentaati ketentuan yang ada dalam perjanjian ini.
2. Apabila pihak KEDUA mengundurkan diri dari perjanjian ini secara sukarela sebelum habis masa pinjaman dan uang yang telah masuk pada pihak KESATU tidak dapat ditarik kembali.
3. Apabila habis masa pinjaman.

P A S A L. 4  
L A I N - L A I N

1. Surat perjanjian ini berlaku selama 5 tahun terhitung mulai tanggal 1 September 1987 sampai dengan 1 September 1992 dan sampai dengan adanya pembatalan.
2. Surat perjanjian ini dibuat dalam rangkap 5 (lima) yang 2 (dua) lembar dihabisi meterai sebesar Rp 1.000,- (seribu rupiah), asli surat perjanjian ini untuk Kepala Dinas Pertanian Tanaman Pangan Propinsi Dati I Jawa Barat Cabang Dinas IV Purwakarta, lembar kedua untuk Penanggung Jawab Sentra Peramalan Hama & Penyakit Tanaman Pangan Jatisari sedangkan yang lainnya untuk pihak yang berkepentingan.
3. Hal-hal yang belum diatur dalam perjanjian ini akan diatur kemudian.

Purwakarta, 22 Agustus 1987.

Pihak KEDUA,

Pihak KESATU,

Penanggung Jawab Sentra Peramalan  
Hama dan Penyakit Tanaman Pangan  
Jatisari Karawang,

Kepala Dinas Pertanian Tanaman  
Pangan Propinsi Daerah Dati I  
Jawa Barat Cabang Dinas IV Purwakarta



Ir. Erna Budiyanto  
Nip: 080053626.



Karwadhara P.Sc.  
Nip: 480027893.



PEMERINTAH PROPINSI DAERAH TINGKAT I BALI  
DINAS PERTANIAN TANAMAN PANGAN  
JALAN RAYA NO. SUPRATNI NO. 51 TELEFON 23716  
DENPASAR

Noor : 521.51/1379/70.

Tempat : - 421/1379/70  
Prihal : Penyediaan Lahan Sawah  
di Lokasi Laboratorium  
Pengamatan dan Peramalan  
Hama dan Penyakit Tanaman  
Pangan.

Denpasar, 3 Agustus 1987.

Yth : <sup>Prof. D. D. G.</sup>  
Saudara Direktur Perlindungan  
Tanaman Pangan  
Jalan Ragunan Pasarsungu  
Jakarta - Selatan  
di -

(種子生産園(公有地)の水田0.48.5 421/1379/70 研究園場L17  
使用の上を承認す)

Menunjuk surat saudara tertanggal 20 Juli 1987 Nomor : VI.PT.020.317. 87.Dir, perihal tersebut diatas maka bersama surat ini dengan hormat, kami sampaikan bahwa pada dasarnya kami menyetujui untuk dapat menggunakan lahan Sawah Dinas di lokasi Laboratorium Celuk Kecamatan Sukawati Kabupaten Gianyar dalam rangka kegiatan studi tungro ± seluas 40 are mengingat terbatasnya lahan Balai Benih bersangkutan.

Selubungan dengan hal tersebut diatas perlu pula kami jelaskan disini bahwa penggunaan tanah tersebut adalah selaku meminjam.

Demikianlah agar saudara maklum adanya.

PEMERINTAH PROPINSI DAERAH TINGKAT I BALI  
DINAS PERTANIAN TANAMAN PANGAN  
JALAN RAYA NO. SUPRATNI NO. 51 TELEFON 23716  
DENPASAR  
Ir. I BAGUS TEJANA  
080012093  
18/8/87

Terbaca disampaikan kepada Yth :

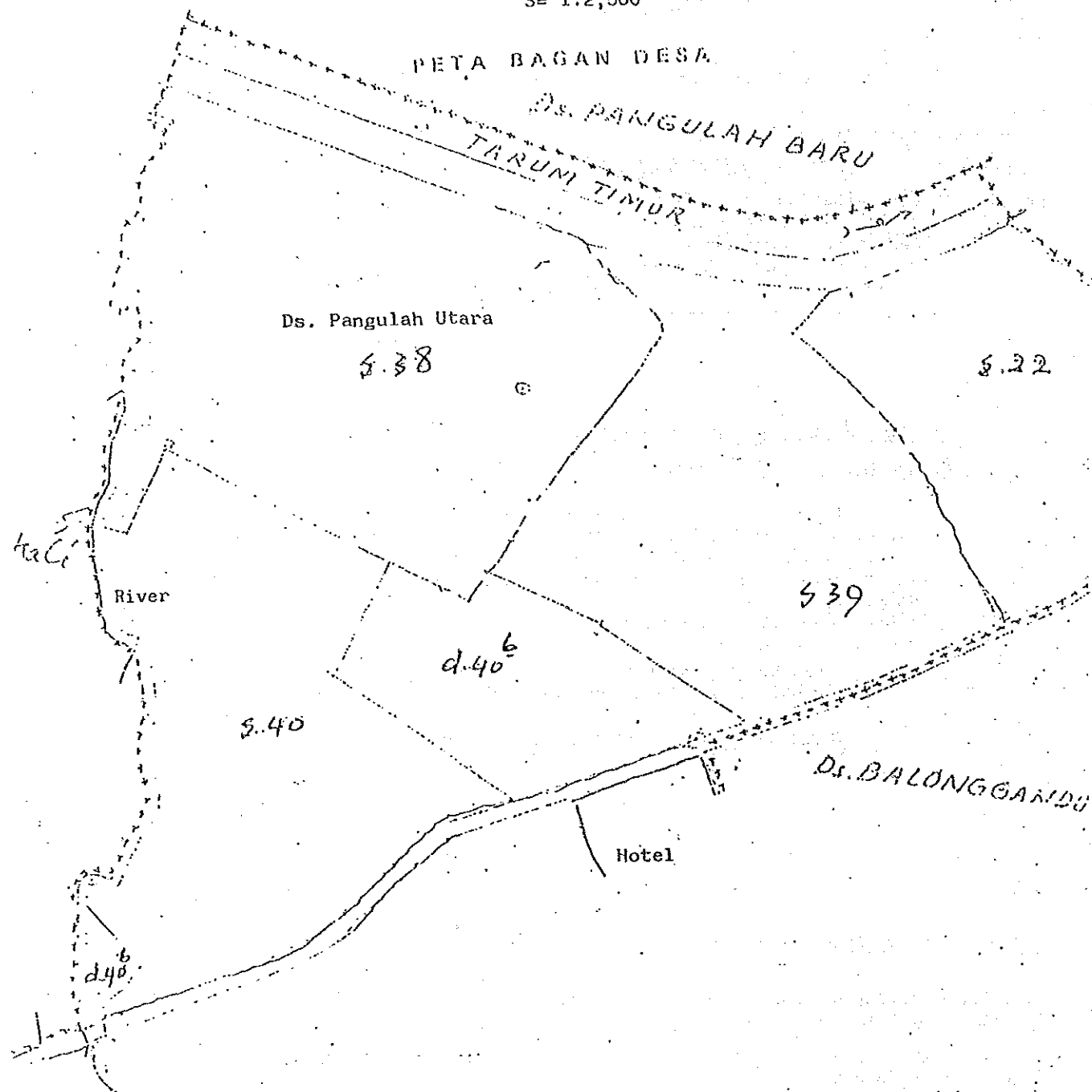
1. Kepala Gubernur Kepala Daerah Propinsi Daerah Tingkat I Bali di Denpasar.
2. Kepala Direktur Jenderal Pertanian Tanaman Pangan di Jakarta.
3. Kepala Sub Dinas Bina Produksi Tanaman Pangan Dinas Pertanian Tanaman Pangan Propinsi Daerah Tingkat I Bali di Denpasar.
4. Kepala Cabang Dinas Pertanian Tanaman Pangan Kabupaten Daerah Tingkat II Gianyar di Gianyar.
5. Kepala LPTP Wilayah VII Bali di Denpasar.
6. P e r t a m a n .

Administration Map of Desa Pangulah Utara

Dec. 31, 1987

S = 1:2,500

PETA BAGAN DESA

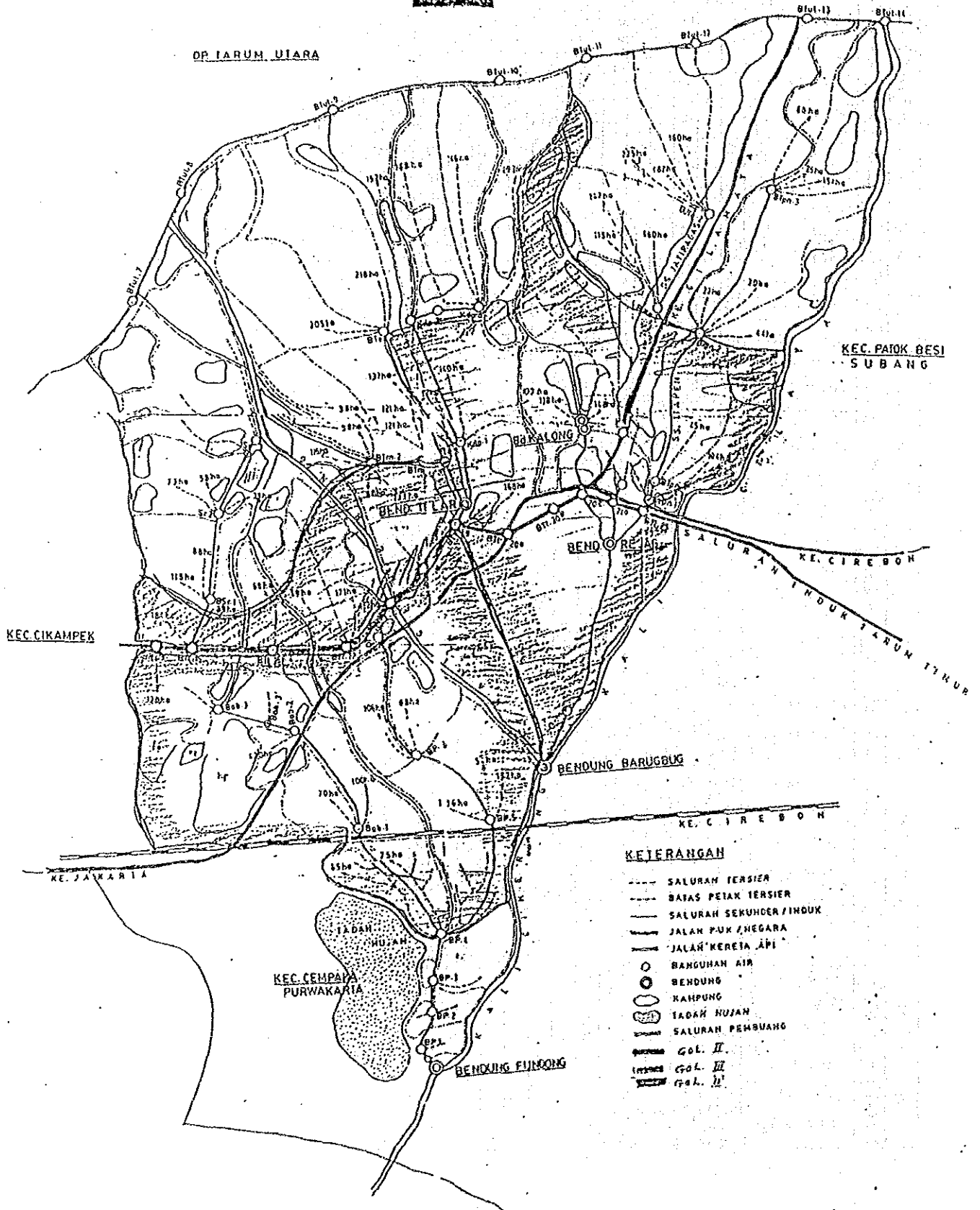




# INVENTARISASI AREAL KEPENGAMATAN EXPLOITASI JATISARI

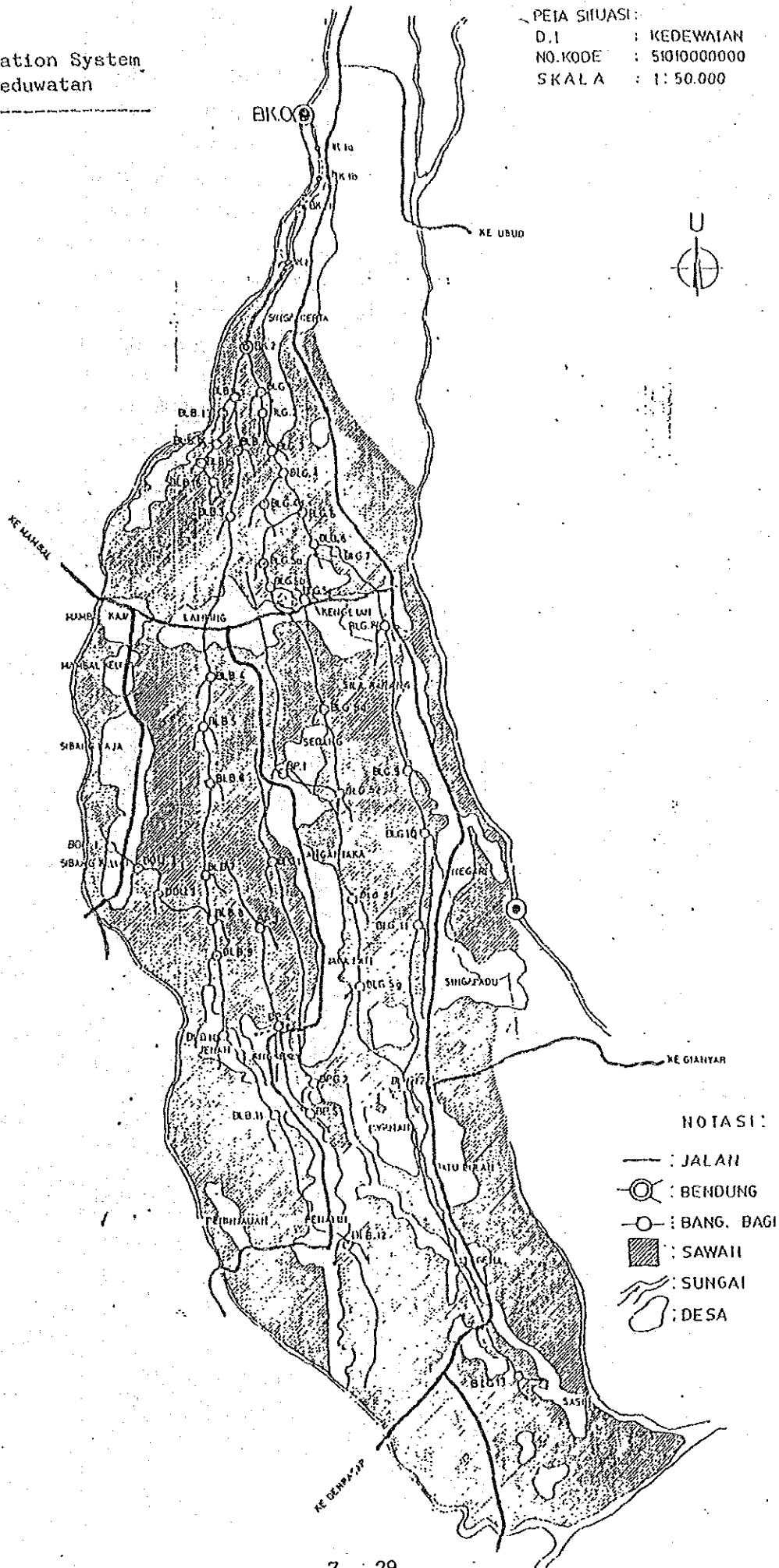
SKALA 1 : 25000

Irrigation System  
around Jatisari



Irrigation System  
for Keduwatan

PEIA SITUASI:  
D.1 : KEDEWATAN  
NO.KODE : 5101000000  
SKALA : 1 : 50.000



Shematic Diagram for Keduwatan

PROPINSI BALI

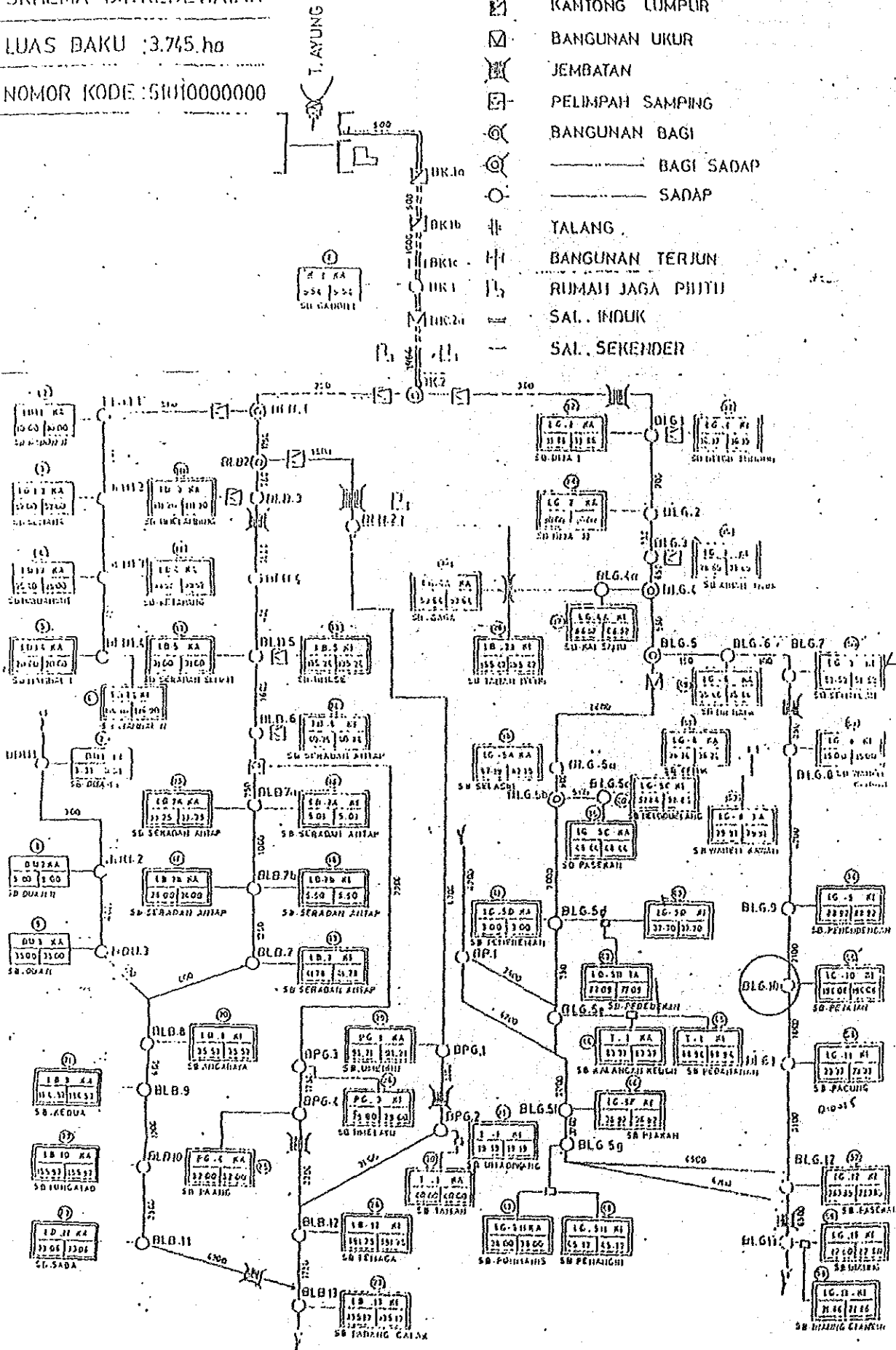
SKHEMA D.I. KEDEWATAN

LUAS BAKU : 3.745 ha

NOMOR KODE : 5111000000

JIYASL

- I-E UEMDUNG
- ☒ KANTONG LUMPUR
- ☒ BANGUNAN UKUR
- ☒ JEMBATAN
- ☒ PELIMPAH SAMPIING
- ☒ BANGUNAN BAGI
- ☒ BANGI SADAP
- SADAP
- ☒ TALANG
- ☒ BANGUNAN TERJUN
- ☒ RUMAH JAGA PIJITU
- ☒ SAL. INDUK
- ☒ SAL. SEKENDER



Monthly Rainfall Data at Celuk

DATA CURAH HUJAN 10 TAHUN

SUMBER DATA: BALAI BENIH CELUK

No. Urut	Bulan	1978		1979		1980		1981		1982		1983		1984		1985		1986		1987		AVE.	
		mm	hh	mm	hh	mm	hh	mm	hh	mm	hh	mm	hh	mm	hh	mm	hh	mm	hh	mm	hh	mm	hh
1	Januari	349	17	265	10	622	20	*	*	342	10	157	11	286	10	98	11	423	26	546	14	343.1	
2	Pebruari	397	15	118	8	147	10	*	*	193	7	36	8	206	20	139	14	339	15	160	9	1928	
3	Maret	238	7	205	11	81	5	*	*	21	1	147	17	305	16	269	11	78	10	-	-	149.1	
4	April	262	10	15	1	33	4	*	*	20	3	114	12	121	11	55	6	194	9	-	-	90.4	
5	Mei	304	10	169	4	5	2	*	*	19	1	198	17	138	9	33	3	19	2	177	4	118.0	5.8
6	Juni	562	12	29	7	-	-	*	*	3	1	37	8	54	5	179	11	193	15	45	3	1224	6.9
7	Juli	209	6	11	7	48	1	*	*	-	-	122	4	48	6	26	7	44	4	60	4	63.1	4.3
8	Agustus	84	5	77	1	-	-	*	*	13	2	16	4	33	5	26	5	34	4	-	-	31.4	
9	September	165	6	-	-	-	-	*	*	-	-	3	1	373	14	15	4	-	-	8	1	62.7	
10	Oktober	232	4	2	1	-	-	*	*	-	-	246	13	15	3	26	6	27	3	27	2	63.9	
11	November	289	13	132	3	-	-	421	15	65	1	213	11	39	6	239	X	191	9	159	12	174.8	
12	Desember	263	6	190	13	-	-	323	12	53	7	128	9	363	25	319	16	161	5	371	21	27.1	

KETERANGAN : - Tidak ada hujan.  
\* Alat rusak.

Total 3354 1213 936 - 729 1417 1919 1185 1703 1557 5601583

昭和37年11月

実施設計報告書

Data for Deep Well

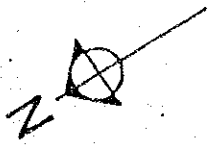
List of Deep Well Pumps

Location Specification	Jatisari Laboratory	Ciba Geigy	Hotel (Located near Jatisari Laboratory)
Form	SHALLOW WELL	SHALLOW DEEP	ELECTRIC SHALLOW DEEP WELL PUMP
Capacity(Suction head)	33ℓ/min(8m)	20ℓ/min(6m)	45ℓ/min(6m)
"	--	15.5ℓ/min(12m)	34ℓ/min(12m)
"	--	--	22ℓ/min(18m)
"	--	--	15ℓ/min(24m)
"	--	--	9ℓ/min(30m)
Discharge head	12m	--	12m
Suction pipe	1" (25mm)	3/4" (19mm)	30mm
Pressure pipe	--	25mm	25~30mm
Discharge pipe	1" (25mm)	--	30mm
Pressure switch	1.4~2.4kg/cm <sup>2</sup>	--	1.4~2.4kg/cm <sup>2</sup>
Out put	250W	300W	400W
Power source	110/220V	110/220V	110/220V
Frequency	50HZ	50HZ	50HZ
[NOTE]			
• Well depth	• 20m	• 45m	• 36m
• Pump maker	• SANYO	• HITACHI	• SANYO



# JATISARI PEST FORECASTING CTR.

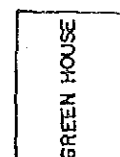
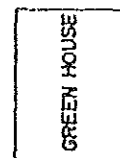
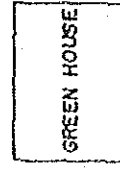
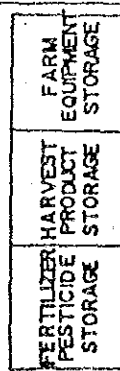
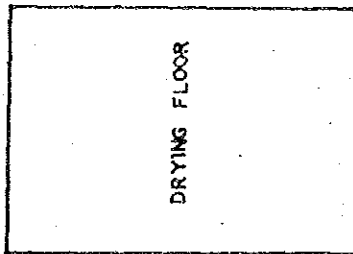
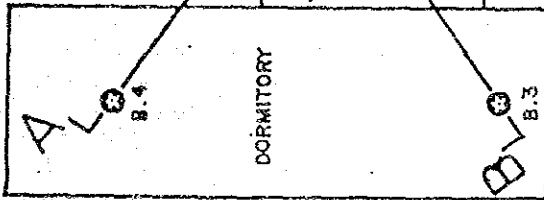
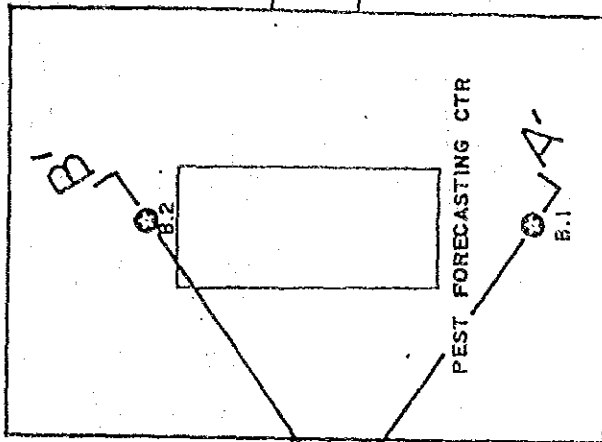
Drilling Data at Jatisari



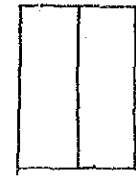
RURAL EXT. SERVICE

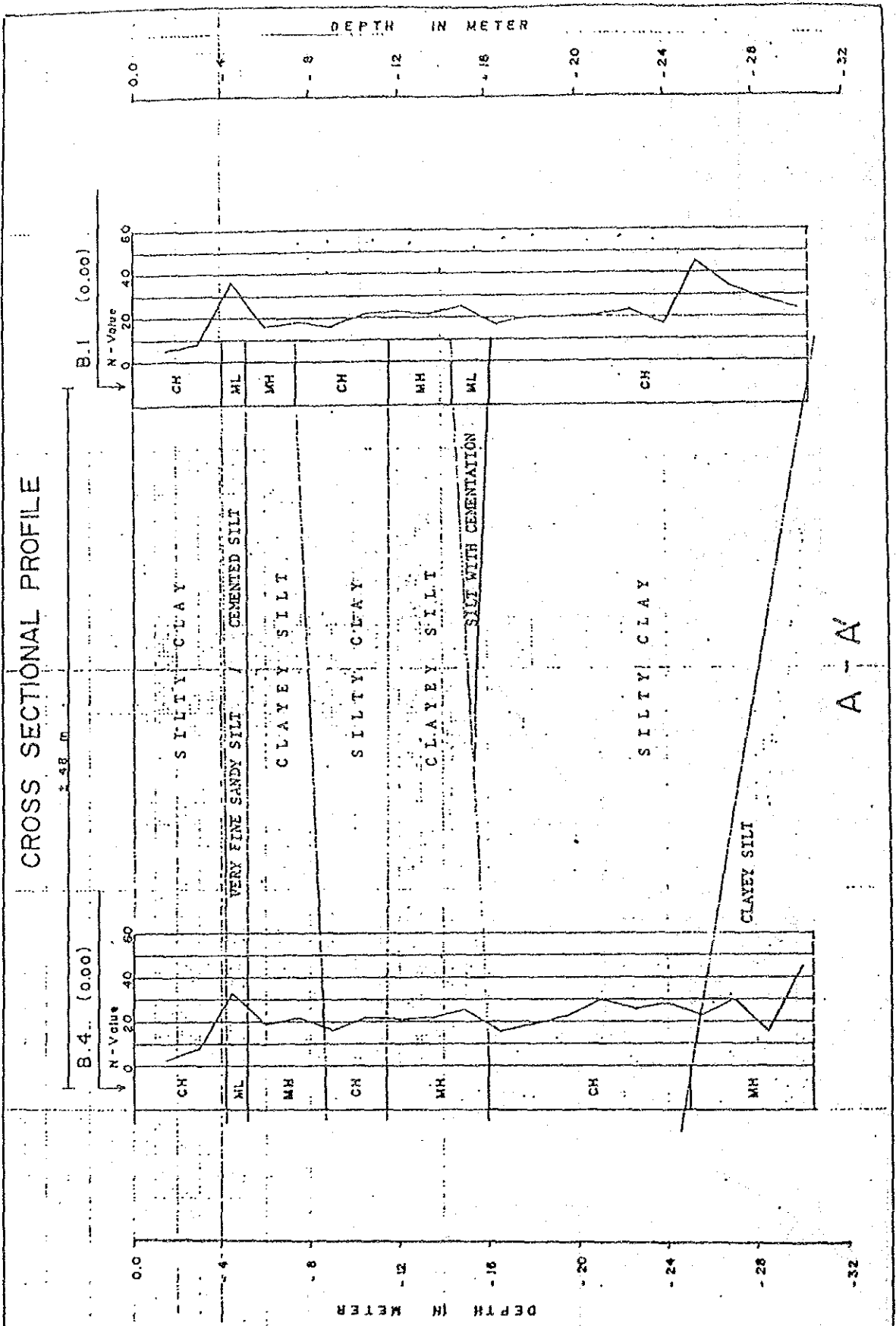
to CIREBON

to JAKARTA



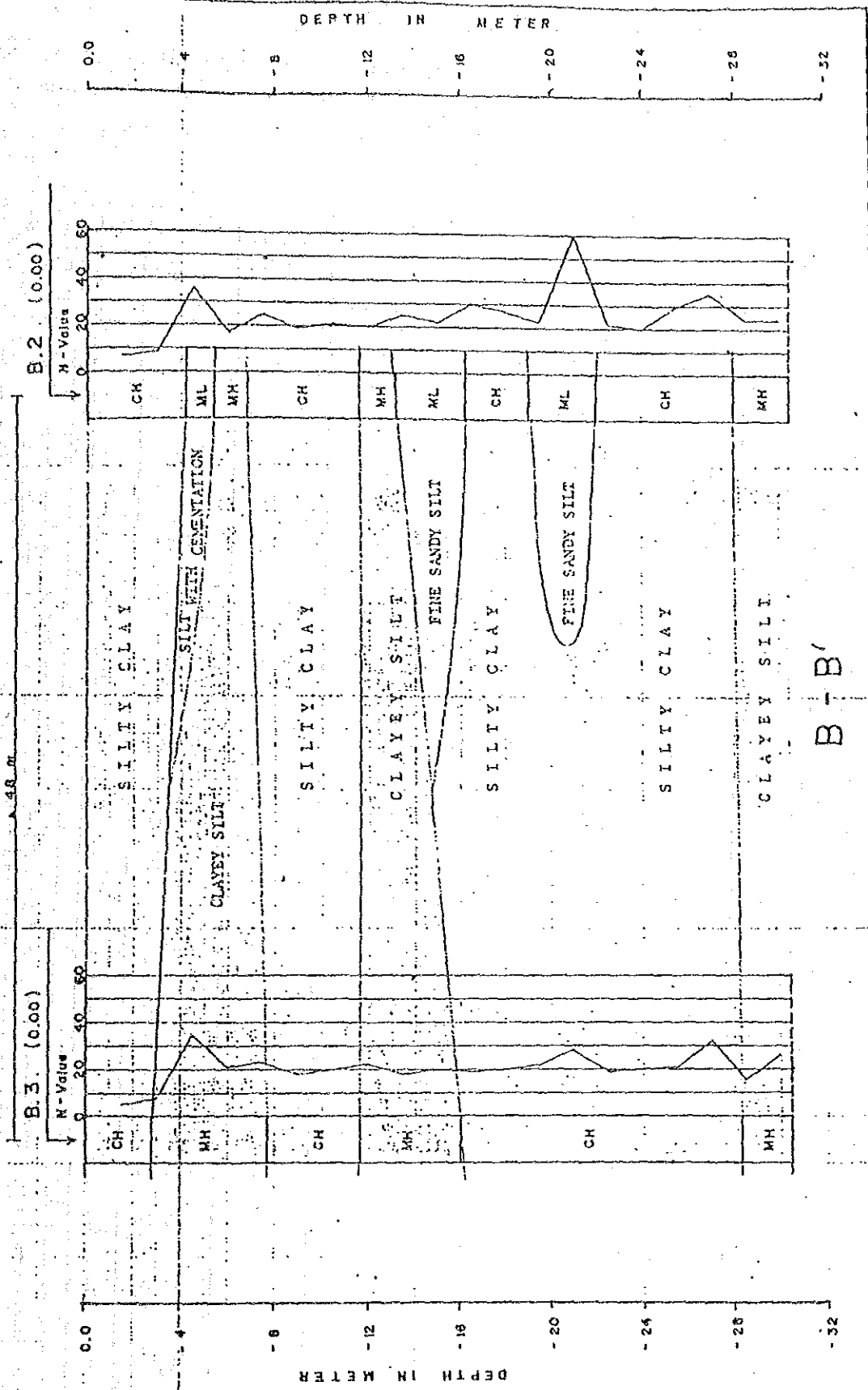
LEGEND:  
 ○ BORING  
 SCALE 1:500





A - A

# CROSS SECTIONAL PROFILE



# BORING PROFILE

PROJECT : PEST AND DISEASE FORECASTING AND CONTROL PROJECT  
 LOCATION : (ATA - 389), JATISARI, KARAWANG - WEST JAVA  
 BORING NO. : BH.1  
 ELEVATION :  
 GROUND WATER LEVEL : - 1.20 M

SCALE (M)	DIAGRAM	SYMBOL	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST					
					DEPTH	N	CURVE 10 30 50			
0		0.00								
		CH	Medium stiff, dark brown silty clay.							
			Idem, colouring greyish brown.		1.50					
			Idem.		1.95	5				
					3.00					
					3.45	8				
		4.10			4.50					
5		ML	Hard, brownish grey cemented silt.		4.95	16				
		5.20			6.00					
		MI	Stiff, greyish brown clayey silt.		6.45	16				
		7.40			7.50					
		CH	Very stiff, light grey silty clay.		7.95	18				
			Colouring yellowish brown and light grey, stiff.		9.00					
10					9.45	16				
			Colouring yellowish brown, very stiff.		10.50					
					10.95	22				
		11.60			12.00					
		MI	Very stiff, greyish brown clayey silt.		12.45	23				
			Idem.		13.50					
					13.95	22				
		14.50			15.00					
15		ML	Very stiff, yellowish brown silt with cementation.		15.45	25				
		16.20			16.50					
		CH	Very stiff, yellowish brown and light grey silty clay.		16.95	17				
					18.00					
					18.45	20				
			Idem.		19.50					
20					19.95	20				
					21.00					
					21.45	21				
			Idem.		22.50					
					22.95	23				
			Idem, colouring greyish brown.		24.00					
25					24.45	17				

SCALE (M)	DIAGRAM	SYMBOL & DEPTH	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST		
					DEPTH	M	CURVE 10 30 50
25		25.00	Hard, reddish brown and light grey silty clay.  Idem, very stiff.				
		CH		25.50 25.95	45		
				27.00 27.45	34		
				28.50 28.95	28		
30		30.45		30.00 30.45	24		
		Boring terminated at a depth of 30.45 M, on October 1, 1985.					
35							
40							
45							
50							
55							

# BORING PROFILE

PROJECT : PEST AND DISEASE FORECASTING AND CONTROL PROJECT  
 LOCATION : (ATA - 389), JATISARI, KARAWANG - WEST JAVA  
 BORING NO. : BU.2  
 ELEVATION :  
 GROUND WATER LEVEL : - 1.10 M

SCALE (M)	DIAGRAM	SYMBOL	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST		
					DEPTH	N	CURVE 10 30 50
0		0.00					
		CH	Medium stiff, greyish brown silty clay.		1.50 1.95	7	
			Idem.		3.00 3.45	9	
5		4.20 ML	Hard, dark brown silt with cementation.		4.50 4.95	36	
		5.40 MH	Stiff, greyish brown clayey silt.		6.00 6.45	17	
		6.80 CH	Very stiff, yellowish brown and light grey silty clay.		7.50 7.95	25	
			Idem.		9.00 9.45	19	
10			Colouring yellowish brown.		10.50 10.95	21	
		11.60 MH	Very stiff, greyish brown clayey silt.		12.00 12.45	20	
		13.20 ML	Very stiff, dark brown fine sandy silt with trace of cementation.		13.50 13.95	25	
			Idem.		15.00 15.45	22	
15		16.20 CH	Very stiff, greyish brown silty clay.		16.50 16.95	30	
			Idem.		18.00 18.45	27	
		19.00 ML	Very stiff, dark grey fine sandy silt.		19.50 19.95	23	
20			Idem, with trace of cementation hard.		21.00 21.39	50 24	
		22.00 CH	Very stiff, yellowish brown and light grey silty clay.		22.50 22.95	22	
			Idem.		24.00 24.45	20	
25							

SCALE (M)	DIA. GRAM	SYMBOL & DEPTH	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST				
					DEPTH	M	C U N V E		
						10	30	50	
25		25.00	Very stiff, yellowish brown and light grey silty clay.  Colouring reddish brown and light grey.						
				25.50 25.95	30.				
		28.00	Very stiff, reddish brown and light grey clayey silt.						
				27.00 27.45	35				
		NII	Very stiff, reddish brown and light grey clayey silt.						
		28.50 28.95		24					
30		30.45	Idem.						
			Boring terminated at a depth of 30.45 M, on October 5, 1985.						
35									
40									
45									
50									
55									

# BORING PROFILE

PROJECT : PEST AND DISEASE FORECASTING AND CONTROL PROJECT  
 LOCATION : (ATA - 389), JATISARI, KARAWANG - WEST JAVA  
 BORING NO. : BH.3  
 ELEVATION :  
 GROUND WATER LEVEL : - 0.65 M

SCALE (M)	DIAGRAM	SYMBOL	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST		
					DEPTH	N	CURVE 10 30 50
0		0.00					
		CH	Medium stiff, greyish brown silty clay.				
			Idem.	1.50 1.95	5		
		2.80		3.00 3.45	8		
		MI	Medium stiff, yellowish brown clayey silt with some fine sands.				
			Idem, colouring brown with trace of cementation very stiff.	4.50 4.95	35		
5			Colouring brownish light grey, some fine sands and trace of cementation grades out.	6.00 6.45	21		
		7.70		7.50 7.95	23		
		CH	Very stiff, yellowish brown and light grey silty clay.				
			Idem, colouring brown.	9.00 9.45	18		
10				10.50 10.95	20		
		11.60		12.00 12.45	22		
		MI	Very stiff, greyish brown clayey silt.				
			Idem.	13.50 13.95	18		
15			Idem.	15.00 15.45	20		
		16.00		16.50 16.95	19		
		CH	Very stiff, dark brown silty clay.				
			Idem.	18.00 18.45	20		
20			Colouring brownish light grey.	19.50 19.95	22		
			Colouring yellowish brown and light grey.	21.00 21.45	28		
			Colouring reddish brown and light grey.	22.50 22.95	19		
				24.00 24.45	20		
25		25.00					

**SOILTEST & FOUNDATIONS**



SCALE (M)	DIAGRAM	SYMBOL & DEPTH	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST		
					DEPTH	N	CURVE 10 30 50
25		25.00 CH	Very stiff, brown and grey silty clay.		25.50 25.95	21	
			Idem, colouring reddish brown and light grey.		27.00 27.45	32	
		28.30 MH	Stiff, reddish brown and light grey clayey silt.		28.50 28.95	16	
30		30.45	Idem, very stiff.		30.00 30.45	26	
			Boring terminated at a depth of 30.45 M, on October 14, 1985.				
35							
40							
45							
50							
55							

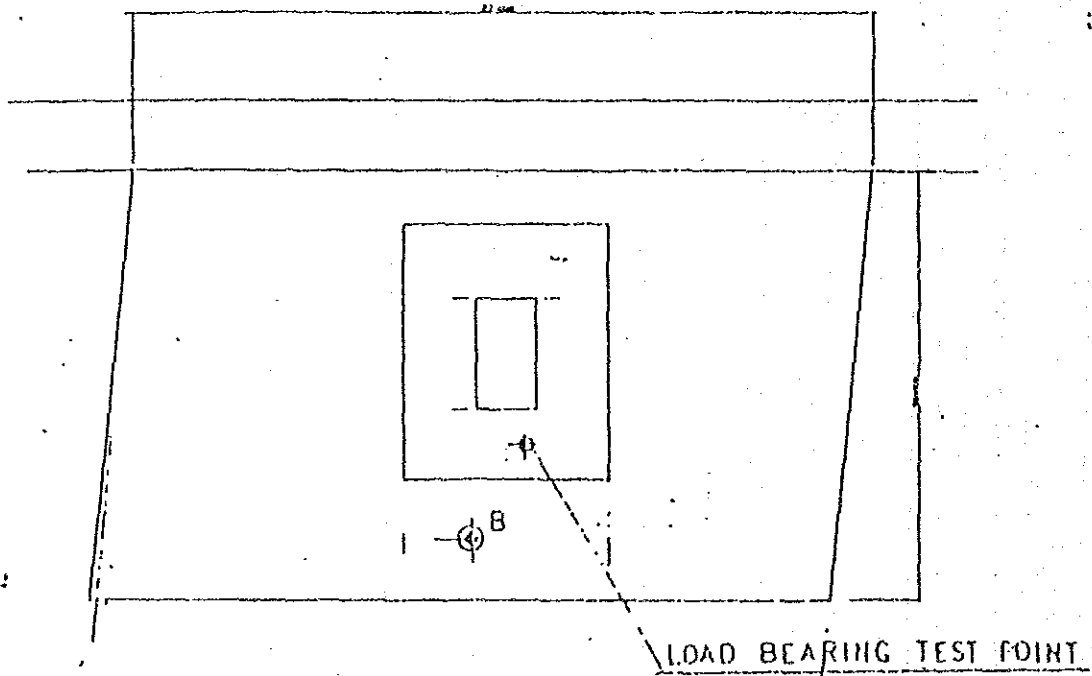
# BORING PROFILE

PROJECT : PEST AND DISEASE FORECASTING AND CONTROL PROJECT  
 LOCATION : (ATA - 389), JATISARI, KARAHANG - WEST JAVA  
 BORING NO. : BH.4  
 ELEVATION :  
 GROUND WATER LEVEL : + 0.00 M

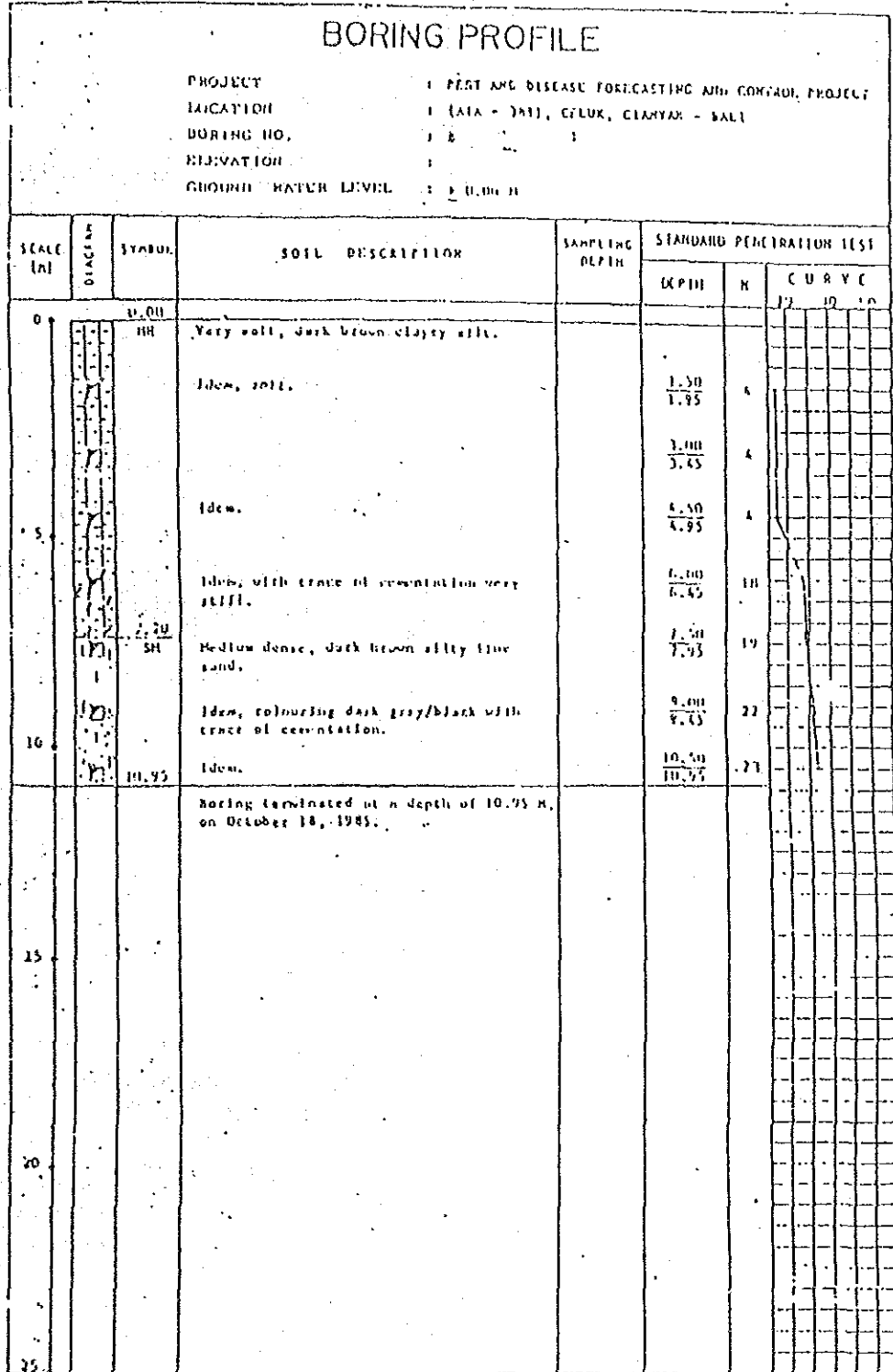
SCALE (m)	DIAGRAM	SYMBOL	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST		
					DEPTH	II	CURVE 10 30 50
0		0.00					
		CH	Very soft, dark grey silty clay with roots of grass. Colouring greyish brown, roots of grass grades out, soft.		1.50 1.95	3	
			Idem, medium stiff.		3.00 3.45	8	
		4.20			4.50 4.95	33	
5		ML	Very stiff, greyish brown very fine sandy silt.				
		5.15			6.00 6.45	19	
		MI	Very stiff, greyish light brown clayey silt. Colouring brown and light grey.		7.50 7.95	22	
		8.70			9.00 9.45	16	
10		CH	Stiff, light grey and brown silty clay. Idem, very stiff.		10.50 10.95	22	
		11.40			12.00 12.45	21	
		MI	Very stiff, light grey and brown clayey silt. Idem. Idem.		13.50 13.95	22	
15					15.00 15.45	25	
		16.00			16.50 16.95	16	
		CH	Stiff, dark grey silty clay. Idem, very stiff.		18.00 18.45	19	
			Colouring brown and light grey.		19.50 19.95	23	
20			Colouring dark brown and dark grey.		21.00 21.45	30	
			Colouring yellowish brown and grey.		22.50 22.95	26	
			Colouring reddish brown and light grey.		24.00 24.45	28	
25		25.00					

SCALE (M)	DIAGRAM	SYMBOL & DEPTH	SOIL DESCRIPTION	SAMPLING DEPTH	STANDARD PENETRATION TEST		
					DEPTH	N	CURVE
							10 30 50
25		25,00	Very stiff, yellowish brown and light gray clayey silt.		25.50 25.95	23	
		Idem, colouring light grey and yellowish brown.					
			Idem.	28.50 28.95	16		
30		30,45	Idem, hard.	30.00 30,45	45		
		Boring terminated at a depth of 30.45M, on October 10, 1985.					
35							
40							
45							
50							
55							

Drilling Data at Celuk



SITE : GIANYAR



- BEARING CAPACITY : 6.0  $\frac{1}{m^2}$
- SOIL STABILIZATION BY LIME SHALL BE EXECUTED.

SPICIFICATION OF NISSAN-TAIYO DIESEL GENERATING SET.

1). T y p e	: Weather proof bonnet, stationary
Capacity prime	: 13,8 KVA
standby	: 15 KVA
No of phase, wire, pole	: 3 Ø, 4, 4
Voltage	: 380/220 V
Frequency	: 50 Hz
Power factor	: 0,8 (lagging)
S p e e d	: 1500 rpm
Starting system	: Auto start & stop
Coupled method	: direct with SAE adaptor flexible disc
Dimensions length	: 1550 mm.
width	: 850 mm
height	: 1100 mm
wieght	: 800 kg

Diesel engine :

T y p e	: 4 stroke, water cooled, generator use constant speed
B r a n d	: Nissan diesel
Manufacturer	: Nissan diesel motor corp. ltd.
Governor type	: Mechanical centrifugal
M o d e l	: SD-1605..
Aspiration	: Natural
Combustion system	: Swirl combustion
No of cyl & arrangement	: 3 cyl vertical in line
Compression ratio	: 20,8 : 1
Bore x stroke	: 83 x 100 mm
Total displacement	: 1.623 cc.
Rating prime DIN 6270A	: 17,5 HP ✓
Rating standby DIN 6270B	: 19,2 HP ✓
Piston speed	: 5 M/second
Engine speed	: 1500 rpm
Speed distortion	
permanent change	: +/- 5%
temporary change	: +/- 10%
Fuel consumption	
at 25% load	: 1,10 L/hour
50% load	: 2,15 L/hour
75% load	: 3,20 L/hour
100% load	: 4,20 L/hour
Fuel oil	: ASTM No.2D
Lub oil	: API service grade SAE 30 class CD
Starting system	: Electric DC-12V
Cooling system	: Water by radiator
Heat rejection	: 85 million jule/hour
Exhaust gas flow	: 8,5 M <sup>3</sup> /hour
Exhaust gas temperature	: 520 C
Torsional vibration characteristic	
cyl No.1 (GD 2)	: 0,0711 kg/M <sup>2</sup>
cyl No.2 (GD 2)	: 0,0421 kg/M <sup>2</sup>
cyl No.3 (GD 2)	: 0,0713 kg/M <sup>2</sup>
flywheel (GD 2)	: 1,5210 kg/M <sup>2</sup>
Noise level 1 M from left side of engine	: 76 db

### Generator :

Type : Drip proof, screen protection, self ventilating, single bearing construction tropically insulated c/w winding damper

Brand : Taiyo

Manufacturer : Taiyo Electric Mfg Ltd

Model : T7-357B1

Output : 15,6 KVA

Efficiency : 83,9 %

Voltage : 380/220V

Frequency : 50 Hz

No of phase, wire, pole : 3, 4, 4

Power factor : 0,8 (lagging)

Rating : Continuous duty, standby duty

Degree of protection : IP-21

Revolution : 1500 rpm

Excitation : Brushless, self exciter

Insulation class : F

Ambient temperature : 40 C

Rule : NEMA, BS

Altitude above sea level : 1000 M

Voltage regulation : +/- 1,5% (no load to balance full load)

Wave form distortion factor : 3% (no load phase - phase)

Telephon influence factor : Less than 50 (no load phase - phase)

Telephon harmonic factor : 2% (no load phase - phase)

Radio interference suppression : Well under commercial standard

Voltage stability : +/- 0,25%

Under speed protection : Volts per hertz protection circuit built in automatic voltage regulator

Over speed : 25%

Over load capacity : 10% at 1 hour/ 12 hours periode operation

Voltage adjustment limit : +/- 5%

Unbalance load : 15% at continuous operation 20% for 15 minutes only

### Scope of supply :

- Diesel engine
- Generator
- Exhaust silencer, flexible pipe & flanges
- Autosutdown device for low oil pressure & high water cooling temperature
- Radiator kit
- Air cleaner kit
- Starting battery
- Engine tools kit
- Operation manual

- Auto stater unit & control panel : 1 pc hour counter
- 1 pc tachometer
- 1 pc lub oil pressure indicator lamp
- 1 pc water temperature
- 1 pc starting switch
- 1 pc MCCB 3 Ø for over load trip & over current trip
- 1 pc AVR
- 1 source lamp
- 1 set fuse for control circuit
- 1 pc hand trimer voltage adjusting
- 1 set auto battery charger
- 1 set out put load terminal
- 1 set off - man - auto selector switch
- 1 set start - stop push button switch
- 1 set fuel daily tank 40 L.
- 1 set weather proof type bonnet



## Data for Deep Well Pumps

### APPLICATIONS

Waterworks  
Factories  
Fountains

Agriculture  
Buildings

### FEATURES

1. Higher operating efficiency over a wider range of capacities, lowers operational cost.
2. Trouble-free operation, ease of maintenance.
3. No pump house required, silent operation.
4. Enclosed motor filled with fresh water enables pump to handle water containing some sediment.
5. Safe, continuous operation.

### SPECIFICATIONS

	STANDARD	OPTIONAL
Well dia:	75 mm (3in) to 300 mm (12in)	
Capacity:	50Hz: To 6.5m <sup>3</sup> /min (To 1717 USGPM or 1430 ImpGPM) 60Hz: To 8m <sup>3</sup> /min (To 2114 USGPM or 1760 ImpGPM)	
Head range:	50Hz: To 360m (1180 ft) 60Hz: To 360m (1180 ft)	
Synchronous speed:	50Hz: 3000 min <sup>-1</sup> 60Hz: 3600 min <sup>-1</sup>	
Rotation:	C.C.W. when viewed from motor	
Liquid handled:	Well water	
Temperature limit:	0 to 40°C (32 to 104°F)	
PH limit:	6.5 to 8.0	Larger duties available
Contained sand limit:	To 50 p.p.m	Larger duties available
Sand size limit:	To 0.25 mm	Larger duties available
Contained chlorine limit:	To 500 p.p.m	Larger duties available
Material:		
Bowl	Cast Iron	Stainless steel/Bronze/Cast steel
Impeller	Stainless steel for 100 mm (4in) Well Bronze for 150 mm (6in) to 300 mm (12in) Well	Stainless steel/Bronze
Shaft	Stainless steel	
Motor:		
Casing material	Steel	Stainless steel
Start system:		
Line start	0.75 to 132 kW (1 to 175 HP)	Start systems for larger capacity motors
Star delta start	5.5 kW to 132 kW (7.5 to 175 HP)	Reactor start/Kondorfer start
Others		Closed-circuit transition type star-delta start
Accessories	Submersible cable . . . .5m	Automatic air vent valve Main riser pipe Cable clips Companion flange Well cover with discharge elbow Anchor bolts for well cover Compound gauge Check valve Gate valve Control panel Electrode for well level control device

## ACCESSORIES

**1. Riser pipes:**

Riser pipes, which convey pump discharge to ground level, also support the pump. Generally made of steel, they are connected by flanges made to JIS B 8324 standards. Flanges are notched to accommodate power cable and low water level electrode. BHS pumps used for "4" wells use threaded pipe connections.

**2. Discharge elbow**

Used to connect the riser pipe to valves and system piping, the discharge elbow provides mountings for a compound gauge and automatic air vent. Flange on suction piping side conforms to JIS B 8324 standards and flange on check valve side is JIS 10 kg/cm<sup>2</sup> thin type.

**3. Check valve**

This one-way check valve prevents reverse water flow. Malfunction of this valve can cause reverse pump rotation and damage to pump and motor.

**4. Sluice valve**

Controls pump output.

**5. Automatic air vent valve**

Automatically vents suction piping during start-up and permits air entry after pump is stopped.

**6. Compound gauge**

Indicates discharge pressure of the pump, which is the sum of the measured value, operational water level and friction loss.

**7. Well cover**

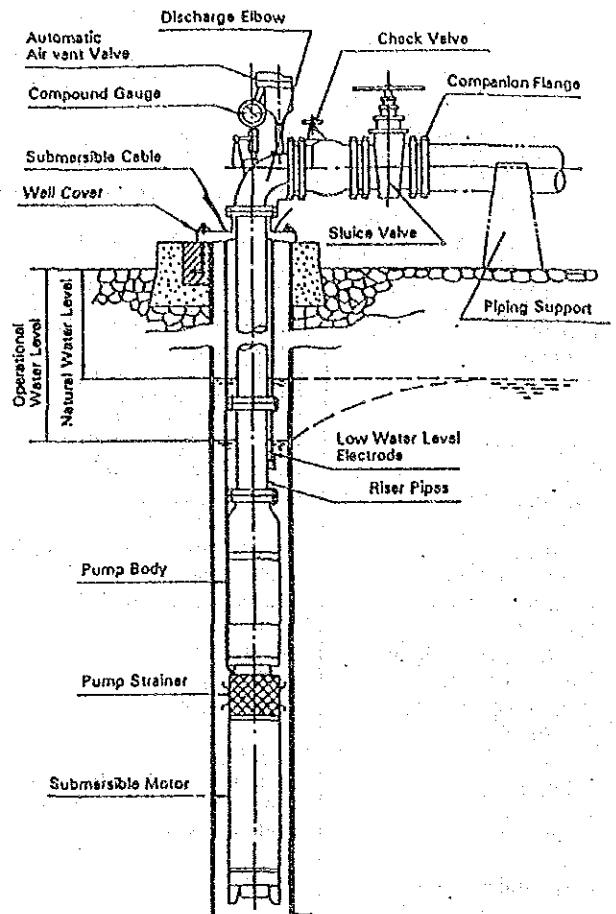
The well cover, split to facilitate pump installation, supports weight of pump and riser pipes and has openings for necessary cabling.

**8. Submersible cable**

The flat vinyl power cable is easily installed and will not swell or deteriorate.

**9. Low water level electrode**

Provides for automatic pump operation and prevents dry operation.



# DIMENSIONS

■ Min. Well dia 150mm (6 in.)

50Hz						
Model	Impeller No.	Dimensions (mm)		Weight (Mass) kg	Figure	
		Disch. Size d	Length L			
40BHS 4-1.5	6A	40	1197	140	50	B
40BHS 7-2.2			1416	140	61	
40BHS 12-3.7			1648	140	102	
40BHS 15-5.5			1837	142	116	
40BHS 18-7.5			1981	142	126	
40BHS 20-7.5			2142	142	130	
40BHS 24-7.5HT			2631	142	166	
40BHS 29-11			2899	142	196	
40BHS 35-15HT			3278	142	220	
50BHS 3-1.5			6B	50	1101	
50BHS 3-2.2	1320	140			44	
50BHS 6-3.7	1456	140			77	
50BHS 12-5.5	1693	142			95	
50BHS 15-7.5	1902	142			112	
50BHS 18-7.5	2046	142			122	
50BHS 22-11	2563	142			159	
50BHS 27-11	2803	142			179	
50BHS 30-15HT	3180	142			206	
50BHS 33-15HT	3324	142			218	
65BHS 4-2.2	6D	65	1320	140	45	B
65BHS 6-3.7			1432	140	74	
65BHS 9-5.5			1657	142	87	
65BHS 12-7.5			1902	142	102	
65BHS 15-11			2267	142	127	
65BHS 18-11			2447	142	136	
65BHS 20-15			2707	142	157	
65BHS 24-15HT			3160	142	174	
65BHS 27-18.5SLHT			3460	144	213	
65BHS 30-18.5SLHT			3779	144	237	
80BHS 4-3.7	6E	80	1423	142	64	D
80BHS 6-5.5			1688	143	102	
80BHS 8-7.5			1973	143	122	
80BHS 9-11			2268	143	145	
80BHS 11-11			2488	143	159	
80BHS 13-15			2848	143	188	
80BHS 15-15			3068	143	202	
80BHS 18-18.5SLHT			3611	145	253	
80BHS 20-22.5LHT			3950	145	282	
80BHS 4-5.5			6G	80	1528	
80BHS 5-7.5	1718	143			106	
80BHS 7-11	2153	143			138	
80BHS 10-15	2668	143			177	
80BHS 12-18.5SLHT	3131	145			223	
80BHS 14-22.5LHT	3500	145			254	

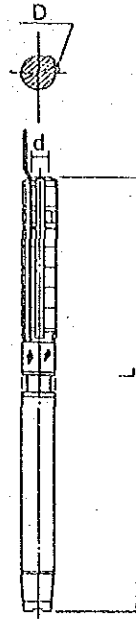


Figure: A

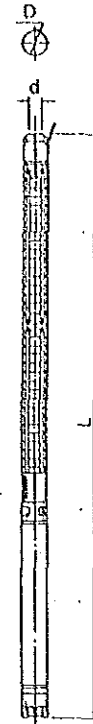
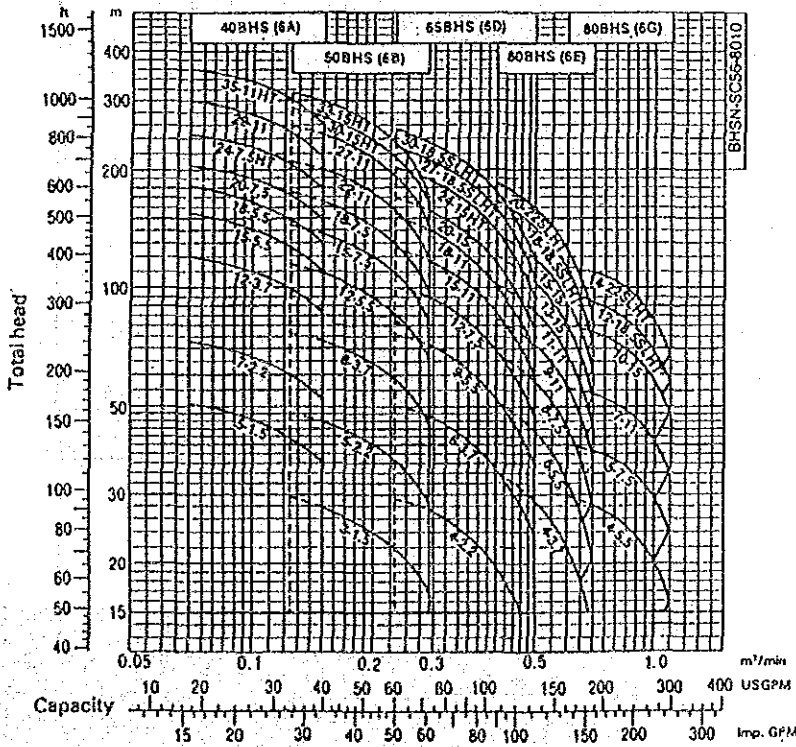


Figure: C

■ Min. Well diameter 150mm (6 in.)

The 80 BHS is for 200mm (6 in.) if flange type.



### Symbols

- 32 BHS (4A) 11-5.75
- Motor output: kW
- S: Single phase
- No mark: Three phase
- Frequency: 50Hz
- No. of stages
- Impeller No.
- Model
- Discharge size: mm

# DENYO DCA-A&LB SERIES

## SPECIFICATIONS

Model		DCA-14AM	DCA-14LBM	DCA-17AM	DCA-17LBM	DCA-20AM	DCA-20LBM
Alternator	Model	DH-14AM		DH-17AM		DH-20AM	
	Output Rating (kVA)	50 Hz	Prime	10	12.5	16	
			Standby	11	13	17.5	
		60 Hz	Prime	14	17.5	20	
			Standby	15	19	22	
	No. of Phases	3-Phase, 4-Wire System					
	Rated Voltage (Line-to-line/Line-to-neutral)	Single Voltage System: 440/254, 415/240, 400/230, 380/220 230/133, 220/127, or 200/115 volts					
	Rated Frequency/Rated Speed	50Hz/1500rpm or 60Hz/1800rpm					
	Power Factor	0.8 (Lagging)					
	Voltage Regulation	Within $\pm 2.5\%$					
Excitation	Brushless, Rotating Exciter (with AVR)						
Insulation	Class F						
Engine	Make & Model	Mitsubishi S2E		Mitsubishi S2E2		Mitsubishi S3E	
	Output Rating (PS)	50 Hz	Prime	14	16.5	21	
			Standby	15	17.5	23	
		60 Hz	Prime	18	20.5	26	
			Standby	19	21.5	28	
	Rated Speed	1500/1800rpm					
	Bore (mm) X Stroke (mm)	94 X 94		98 X 98		94 X 94	
	Piston Displacement (cc)	1300		1480		1960	
	No. of Cylinders	2		2		3	
	Fuel	JIS No. 2 or ASTM No. 2 Diesel Fuel, or Equivalent					
Fuel Consumption (50/60 Hz, l/hr)	3.5/4.5		4.2/5.2		5.3/6.5		
Lube Oil Sump Capacity (l)	4.5		4.5		6.5		
Governor	Mechanical All Speed Governor						
Starting Motor (V-kW)	12 - 2						
Charging Generator (V-A)	12 - 35						
Air Cleaner Type	Dry						
Coolant Capacity (l)	4.5		6		7		
Battery Capacity (AH)	50 X 1						
Fuel Tank Capacity (l)	Unit-Mounted	40					
Dimensions & Weight	Length (mm)	1360	1300	1360	1300	1500	1500
	Width (mm)	720	700	720	700	720	700
	Height (mm)	1170	1330	1170	1330	1170	1350
	Weight (kg)	510	480	520	500	600	550

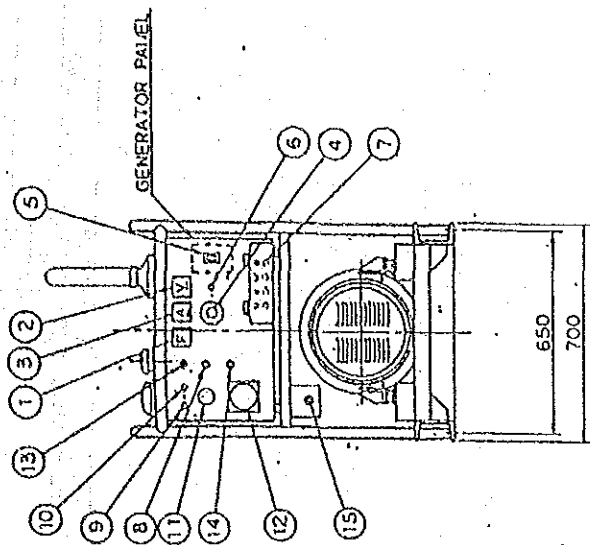
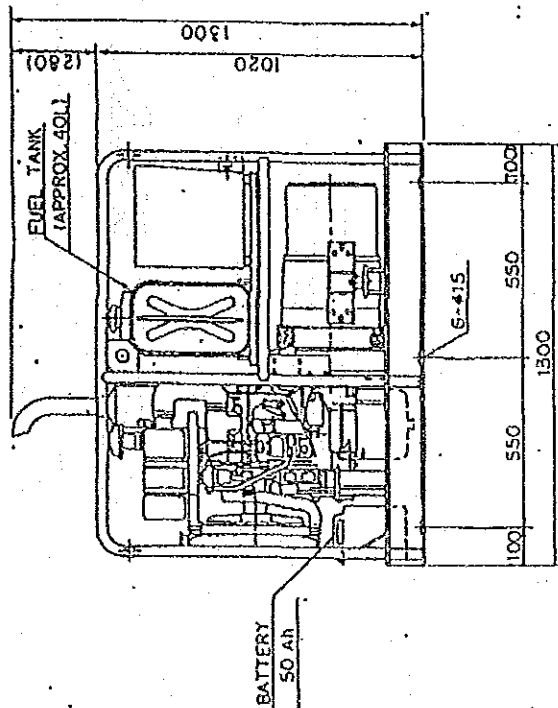
Specifications are subject to change without notice for further improvement.

Direct inquiries to the nearest Denyo distributor or to Denyo Co., Ltd.

Power Source Professionals  
**Denyo Co., Ltd.**

HEAD OFFICE  
 1-2-2, Kamiyoga, Nakatama-ku, Tokyo 144, Japan  
 Osaka Office: 2-2-1, Nishi, Chiyoda-ku, Osaka 540, Japan  
 Cebu Office: DENYO CO. INC.,  
 1050, 10th Ave., Cebu City, Philippines  
 Tel: 332-2838 DENYO

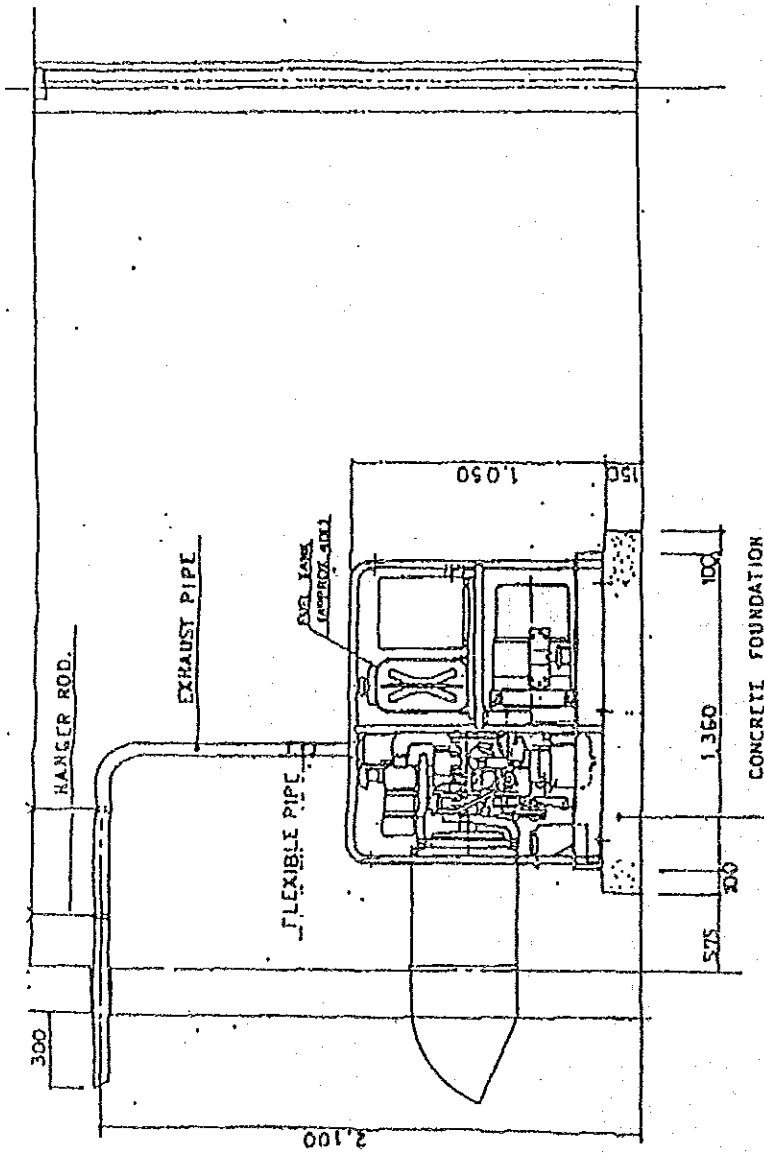
Printed in Japan



GENERATOR PANEL			
No.	PARTS NAME	No.	PARTS NAME
1	FREQUENCY METER	11	WATER TEMPERATURE GAUGE
2	AC VOLT METER	12	TACHOMETER
3	AC AMMETER	13	STOP BUTTON
4	VOLTAGE REGULATOR	14	STARTING SWITCH
5	CIRCUIT BREAKER	15	THROTTLE HANDLE
6	PILOT LAMP		
7	OUTPUT TERMINAL		
8	PREHEATING LAMP		
9	CHARGING ALARM LAMP		
10	OIL PRESSURE ALARM LAMP		


ENGINE MITSUBISHI S2E  
 GENERATOR DH-14A-M  
 DRY WEIGHT APPROX. 480 KG

PROJECT CHECKED BY T. S. S. S.	DESIGNED BY K. S. S. S.	SCALE 1/10	DATE 1/10	DRIVING A ENGINE GEN DCA-14L	DRIVING A ATOR
OUTLINE D			AWING		
Denyo Co., Ltd.			739010		
			302		

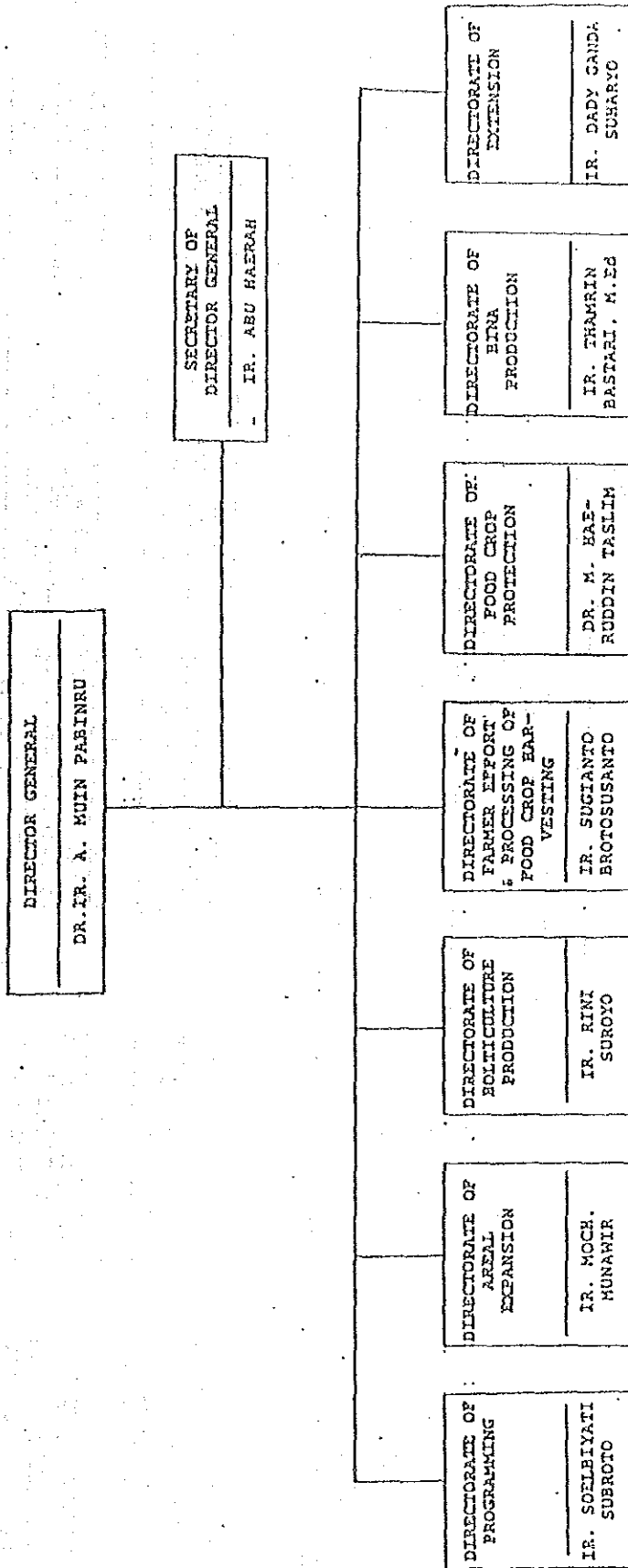


GENERATOR GENERAL VIEW SCALE 1:20

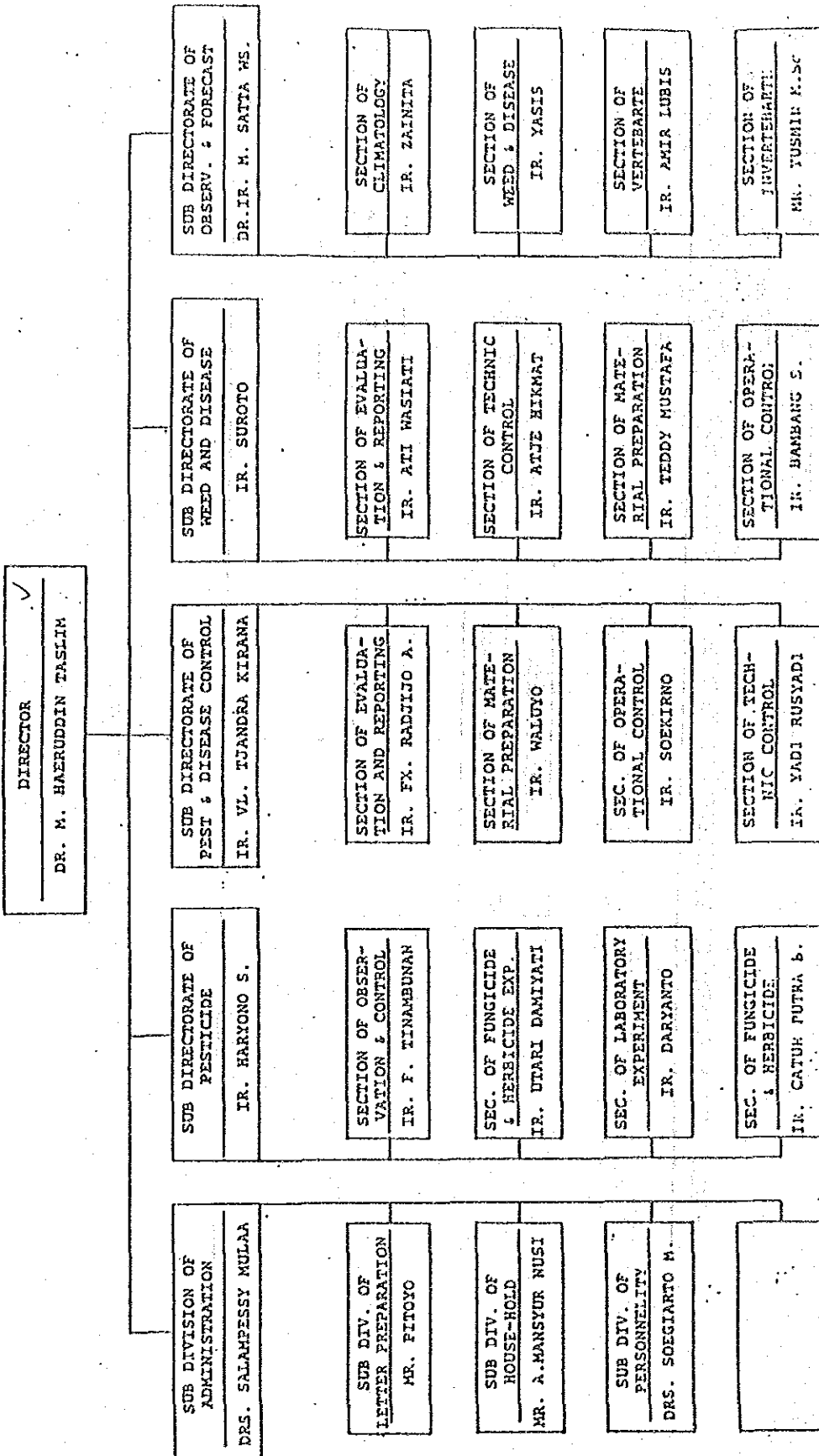
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**Denyo Co., Ltd.**  
 DRAWING NO. \_\_\_\_\_  
 SHEET \_\_\_\_\_ OF \_\_\_\_\_

ORGANIZATION CHART OF DIRECTORATE GENERAL OF FOOD CROP AGRICULTURE

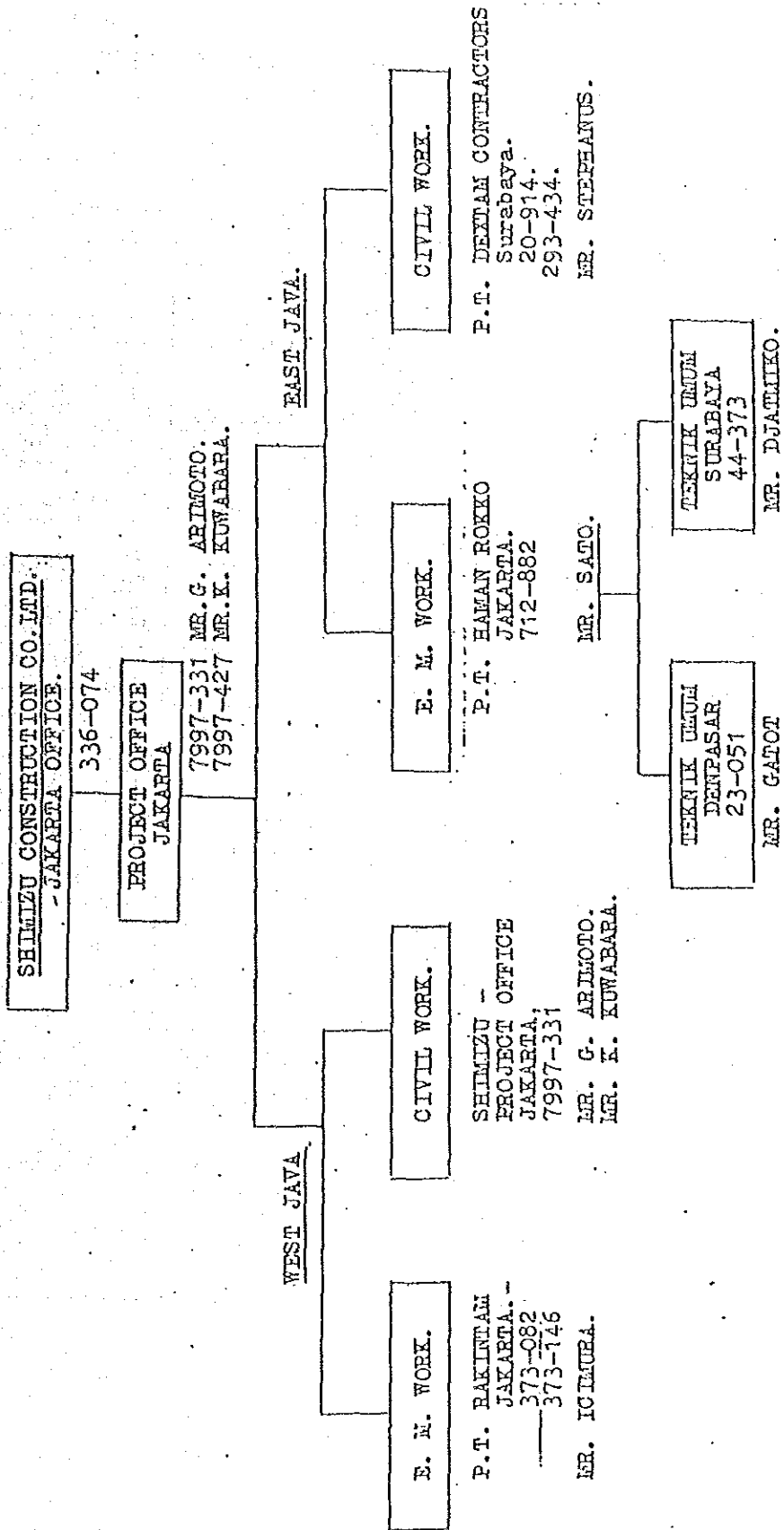


ORGANIZATION CHART OF DIRECTORATE OF FOOD CROP PROTECTION





MAINTENANCE CHART FOR  
THE IMPROVEMENT OF PEST AND DISEASE FORECASTING CONTROL PROJECT  
 ( PHASE I. )



SUB- CONTRACTOR & MATERIAL SUPPLYER LIST

FL.A. GIANYAR.

CIVIL WORKS

KIND OF WORKS	SUB-CONTRACTOR NAME	ADDRESS & TELEPHONE NO.
Pile Work		
Reinforced Concrete Work	PT. HANIL JAYA METAL WORK.	Janti Waru, Phone 813094 PO.Box 355, Surabaya.-
Carpentry Work	YURIKO, Industrial & Trade Co.	Jl. Kedung Cowek No. 68, Phone 310488, 310094 Sby.
Structural Steel Work	P.T. MULCINDO.	Jl. Rungkut Industri II/6 Phone 818165, Surabaya.-
Concrete Roof Tile Work	PT. MONIER INDONESIA	Jl. Melawai Raya 165 Block C-5 Phone 715508, Jakarta.
Wood Shingle Work	CV. NUSA INDAH JAYA.	Jl. Kalianak Timur 229 Phone 270745, Surabaya.
Masonry Work	PT. BETA JAYA.	Jl. Johar No. 59 Phone 46924, Surabaya.
Ceramic Tile Work	K. I. A.	Jl. Belliwerti 68/II. Phone 42810, Surabaya.
Metal Work	P.T. KARYA TEJEBESASH.	Jl. Kapuk Pulo Indah No.2 Phone 6292100, Jakarta.
Steel Door Work	P.T. MULCINDO.	Jl. Rungkut Industri II/6 Phone 818165, Surabaya.
Wooden Door Work	YURIKO, Industrial & Trade Co	Jl. Kadung Cowek No. 68. Phone 310488, 310094 Sby.
Glass & Glazing Work	Toko SINAR RASA.	Jl. Belliwerti 70. Phone 45440, 470700, Surabaya.
Plastering Work	Mandor ABBAS.	Gianyar, Bali.
Painting Work	MAHKOTA SAKTI. (S.K.K)	Jl. BDN. 1/25 Cilandak Phone 760403, Jak. Sel.
Green House Work	P.T. KARYA TEJEBESASH	Jl. Kapuk Pulo Indah No.2 Phone 6292100, Jakarta.
Asphalt Pavement Work	CV. TOMO TIGA UTAMA.	Jl. KH. A Khotib 7 G. Phone 81803, Serang.
Concrete Block Pavement Work	P.T. MONIER INDONESIA	Jl. Melawai Raya 165 Blok C-5 Phone 715508, Jakarta.
Floor Tile Work	CV. URIN INDAH.	Jl. Embong Malang 73.G Phone 471613, Surabaya.
EPA- Finish Work	Mandor ABBAS.	Gianyar, Bali.

## ELECTRICAL / PLUMBING WORKS

KIND OF WORKS	SUB- CONTRACTOR NAME	ADDRESS & TELEPHONE NO.
I. ELECTRICAL WORK		
- LIGHTING FIXTURE	ARTOLITE	GAJAH MADA 3-5, JAKARTA TEL.: 021 346154
	PT. METALINDO	DAAN MOGOT NO. 200, JKT TEL.: 021 592623
- ELECTRIC PANEL	PT. FIRST PURA JAYA	DAAN MOGOT NO. 69, JKT TEL.: 021 597204
- GENERATOR	PT. LESTARI MACHINERY	JL. MANGGA BESAR RAYA 183/46, JAKARTA TEL.; 021 637970
II. MECHANICAL		
- ELEVATED WATER TANK	MARINFIG UTAMA PT.	JL. KEBON KACANG NO. 20 JAKARTA, TEL; 021 326086
- CHEMICAL FEEDER. STERILIZER	PT. BETA PRAMESTI	JL. MATRAMAN RAYA 169, JKT. TEL.: 021 883447
- DEEP WELL PUMP (SHALLOW WELL PUMP)	PT. LESTARI MACHINERY	JL. MANGGA BESAR RAYA JKT, TEL: 021 637970
- EFFLUENT PUMP	MASA JAYA	JL. HAYAM WURUK 76, JKT TEL.: 021 6296973

## ELECTRICAL / PLUMBING WORKS

KIND OF WORKS	SUB- CONTRACTOR NAME	ADDRESS & TELEPHONE NO.
- SANITARY FIXTURE	PT. SURYA PERTIWI	JL. PINANGSIA I NO. 16/ GG-HH, JAKARTA. TEL: 021 679475
- PRESSURE PROPELLA FAN (DUCT FAN)	PT. SEKAWAN ABADI JAYA	Jl. HAYAM WURUK NO. 1 JAKARTA, TEL.: 021-365161
III. SUB CONTRACTOR		
- EAST JAVA	PT. RAKINTAM	JL. MAJAPAHIT 28/IV, JKT TEL.: 021 373082
	PT. HAMAN ROKKO Enter- prise	JL. BARITO II/56-A BARITO PLAZA 2nd Fl, ROOM 209, JKT TEL; 021 712882-712891
	PT. TEKNIK UMUM	JL. RAYA SESETAN 162 BALI, DENPASAR. TEL. 0361 23051
- WEST JAVA	PT. RAKINTAM	Jl. MAJAPAHIT 28/IV, JKT. TEL.: 021 373082

Contractor's List

DAFTAR BIDANG PEMBORONGAN

K a b u p a t o n : Gianyar.  
 Bidang Pekerjaan : S i p i l.  
 Sub Bidang Pekerjaan : Pengairan.  
 Kualifikasi : C<sub>1</sub>

No.	Kode Reklaman	Nama Perusahaan	A l a m a t
1.	1404100030	Pa. Margi Ayu	Jalan Ciung Wenara No.9.
2.	1404100006	CV. Tirta Mas	Tegeho - Sukawati.
3.	1404100072	CV. Lungsur	Jalan Raya Gianyar No. 1 A Batubulan.

K a b u p a t e n : Gianyar.  
 Bidang Pekerjaan : S i p i l.  
 Sub Bidang Pekerjaan : Jalan, Jembatan  
 dan Landasan.  
 Kualifikasi : C<sub>1</sub>

No.	Kode Reklaman	Nama Perusahaan	A l a m a t
1.	1404100018	CV. Widya Karya Niaga	Br. Tengah Kangin, Poliatan.
2.	1404100026	CV. Sura Dharma	Br. Kedewatan.
3.	1404100002	CV. Rama Karya	Br. Tegaltamu - Batubulan.
4.	1404100030	Pa. Margi Ayu	Jalan Ciung Wenara No.9.
5.	1404100051	CV. Wira Karya	Br. Tegeho - Batubulan.
6.	1404100006	CV. Tirta Mas	Tegeho - Sukawati.
7.	1404100023	CV. CV. Astha Seni	Dusun Kemenuh.
8.	1404100027	Pa. Eka Sapta	Sorongga - Lebih.

DAFTAR BIDANG PEMBORONGAN

K a b u p a t e n : Gianyar.  
 Bidang Pekerjaan : S i p i l.  
 Sub Bidang Pekerjaan : Pengairan.  
 Kualifikasi : C<sub>2</sub>

No.	Kode Rekanan	Nama Perusahaan	A l a m a t
1.	1404100026	CV. Sura Bhansa	Desa Kodowatan - Utud.
2.	1404100009	CV. Shuar Karya	Jalan Gambir No. 15 A.
3.	1404100011	CV. Lungsur Utama	Jalan Raya Batubulan No. 21
4.	1404100008	CV. Bali Perdana	Jalan Ciung Wenara 15A.
5.	1404100033	CV. Kerti Karya	Dr. Tatiapi-Pejeng.
6.	1404100023	CV. Astha Seni	Dusun Kementuh, Sukawati.

K a b u p a t e n : Gianyar.  
 Bidang Pekerjaan : S i p i l.  
 Sub Bidang Pekerjaan : Jalan, Jenbatan  
 dan Landasan.  
 Kualifikasi : C<sub>2</sub>

No.	Kode Rekanan	Nama Perusahaan	A l a m a t
1.	1404100031	Ba. Korak	Jalan Gianyar.
2.	1404100004	CV. Pugig	Jalan Pudak.
3.	1404100019	CV. Sari Muncul	Kodowatan.
4.	1404100010	CV. Karya Agung	Jalan Gambir.
5.	1404100035	Ba. Rahayu	Elahbatuh.
6.	1404100022	PT. Kahardika Karya Utara	Dr. Poniujian, Batuan, Sukawati.
7.	1404100013	CV. Jati Karya	Dr. Poteluan - Sidan.
8.	1404100009	CV. Shuar Karya	Jalan Gambir No. 15 A.
9.	1404100020	CV. Jaya Korthi	Desa Sanding, Tampaksiring
10.	1404100011	CV. Lungsur Utama	Jalan Raya Batubulan No. 21
11.	1404100072	CV. Lungsur	Jalan Raya Gianyar No. 14









JICA