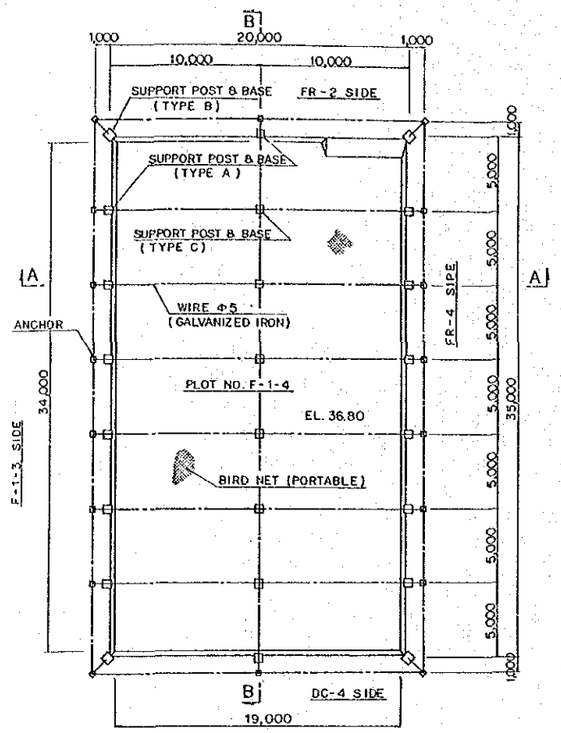
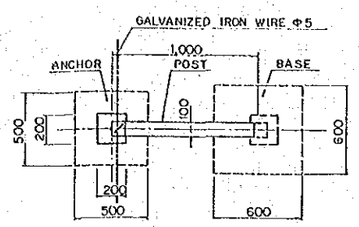
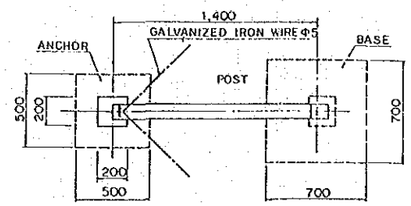


PLAN

BIRD NET AND SUPPORT ARRANGEMENT



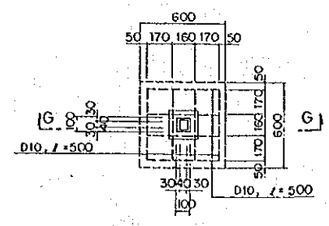
TYPE A



TYPE B

PLAN

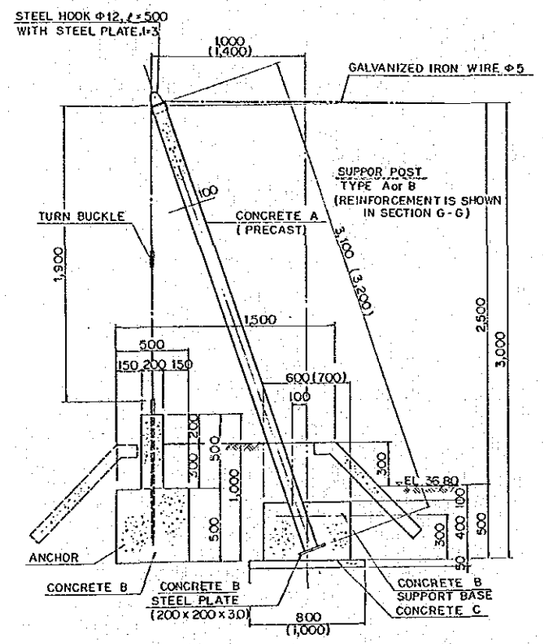
SUPPORT POST TYPE A AND B WITH ANCHOR



SECTION F-F

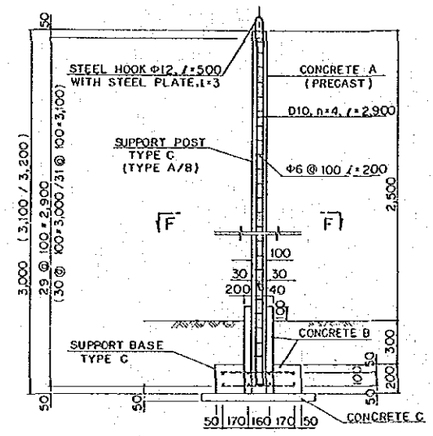
Note :

1. The turn buckle shall have a tensile strength of 0.8 ft or more and an allowable tensile strength of 0.5 ft or more.
2. The galvanized iron wire Φ5 mm shall have a tensile strength of not less than 30 kg f / mm²



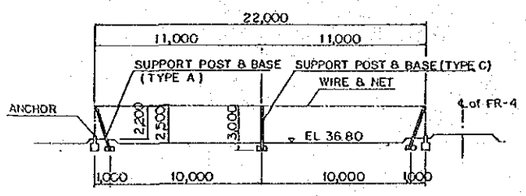
DIMENSIONS IN BRACKETS ARE FOR SUPPORT POST AND BASE TYPE B

SECTION C-C

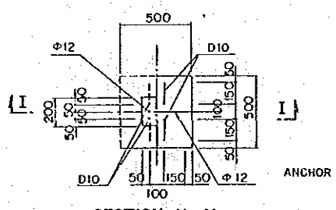


DIMENSIONS IN BRACKETS ARE FOR SUPPORT POST TYPE A/B

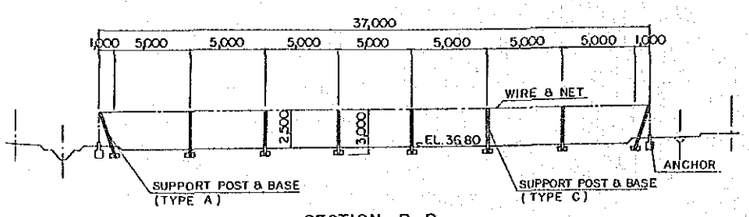
SECTION G-G



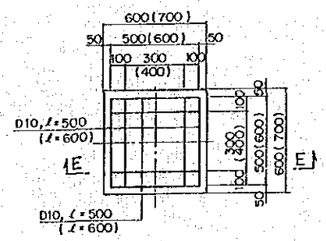
SECTION A-A



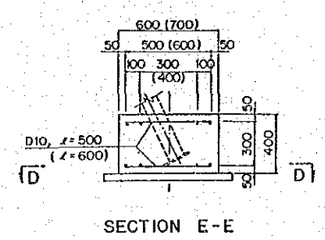
SECTION H-H



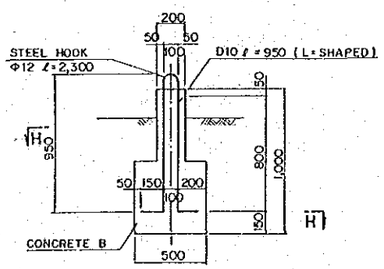
SECTION B-B



SECTION D-D



SECTION E-E



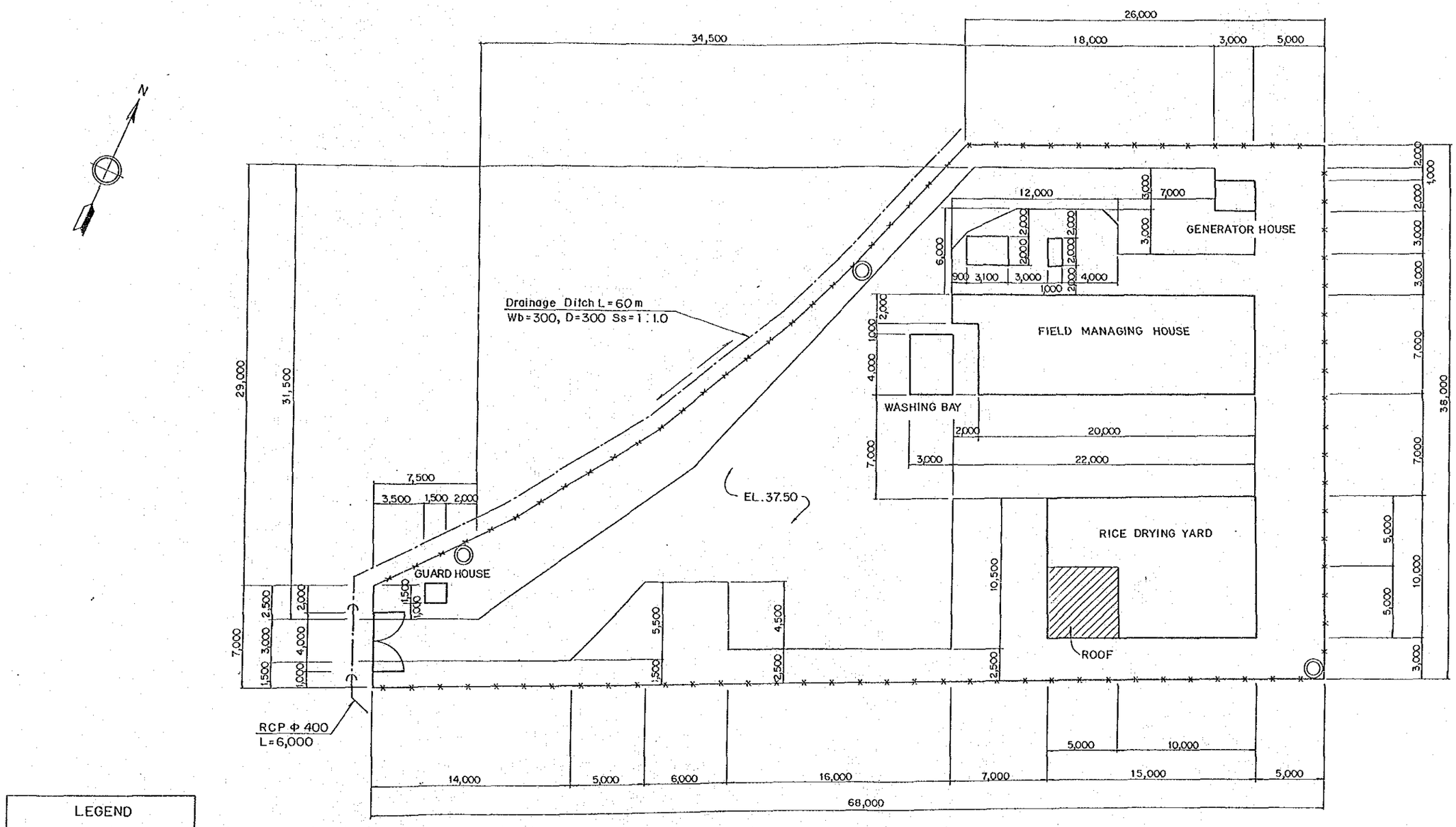
SECTION I-I

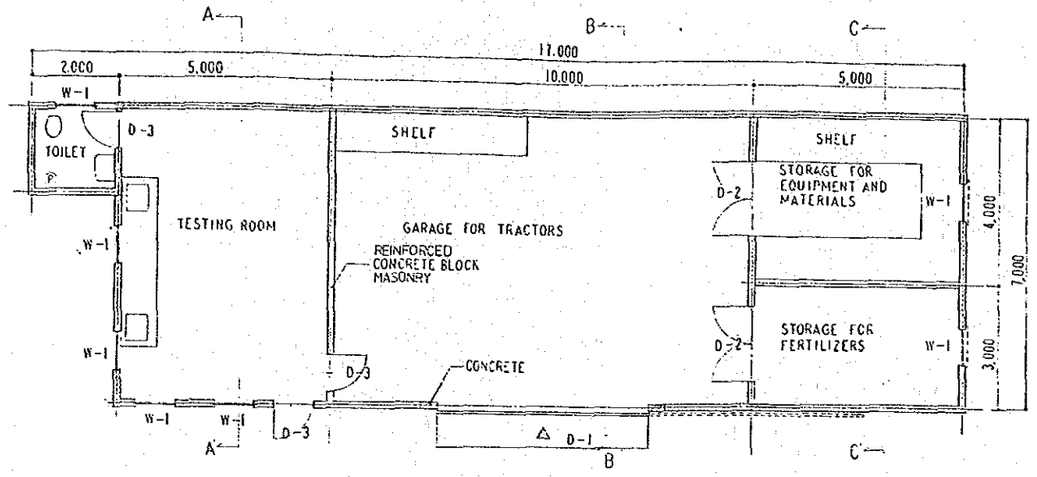
POST BASE TYPE A AND B

FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

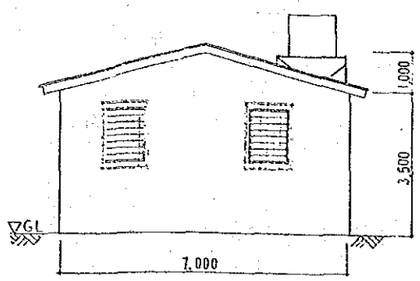
BIRD PROTECTION FACILITY

JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 13

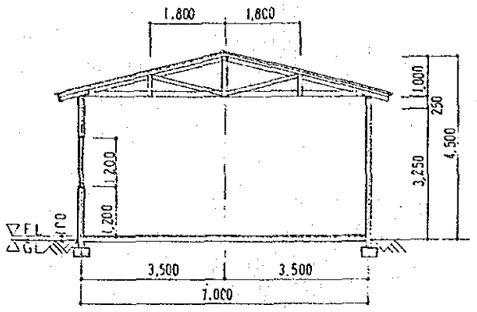

N
34,500
26,000
18,000
3,000
5,000
29,000
31,500
12,000
7,000
3,000
GENERATOR HOUSE
6,000
900
3,100
3,000
1,000
4,000
Drainage Ditch L=60m
Wb=300, D=300 Ss=1:1.0
FIELD MANAGING HOUSE
WASHING BAY
20,000
22,000
EL. 37.50
7,500
3,500
1,500
2,000
GUARD HOUSE
RICE DRYING YARD
10,500
ROOF
35,000
10,000
5,500
4,500
RCP Φ 400
L=6,000
14,000
5,000
6,000
16,000
7,000
15,000
68,000
LEGEND
Security Light
Gate
Fence
Gravel Pavement
Building, Tank
Drainage Ditch
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS
FACILITY YARD LAYOUT
JAPAN INTERNATIONAL COOPERATION AGENCY
DWG NO. 14



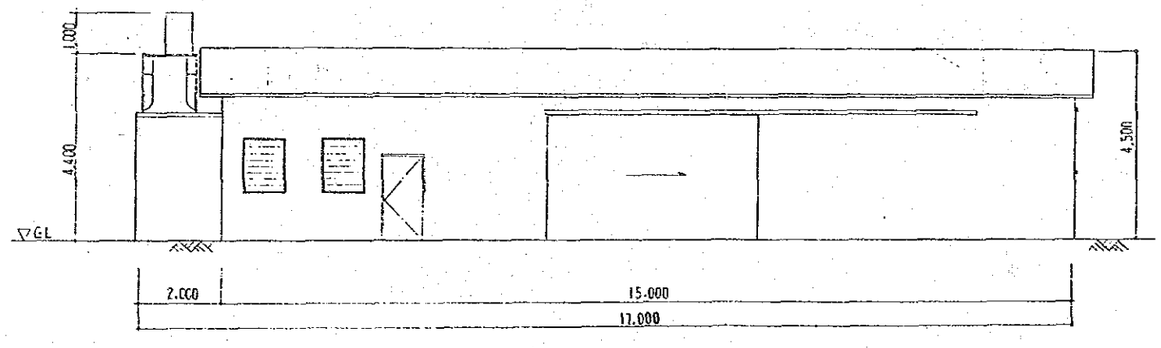
FLOOR PLAN



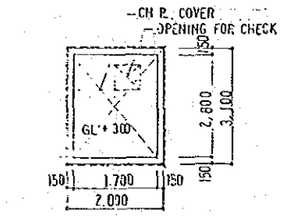
SIED ELEVATION



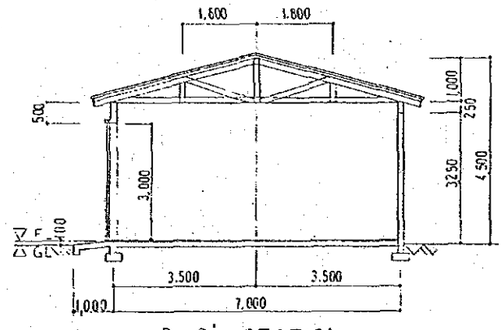
A-A' SECTION



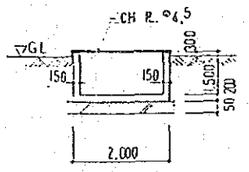
FRONT ELEVATION



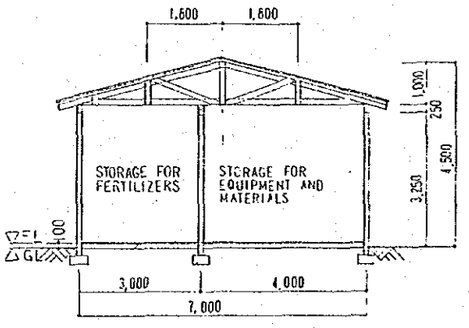
WATER TANK PLAN



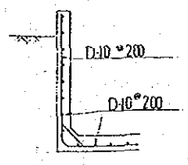
B-B' SECTION



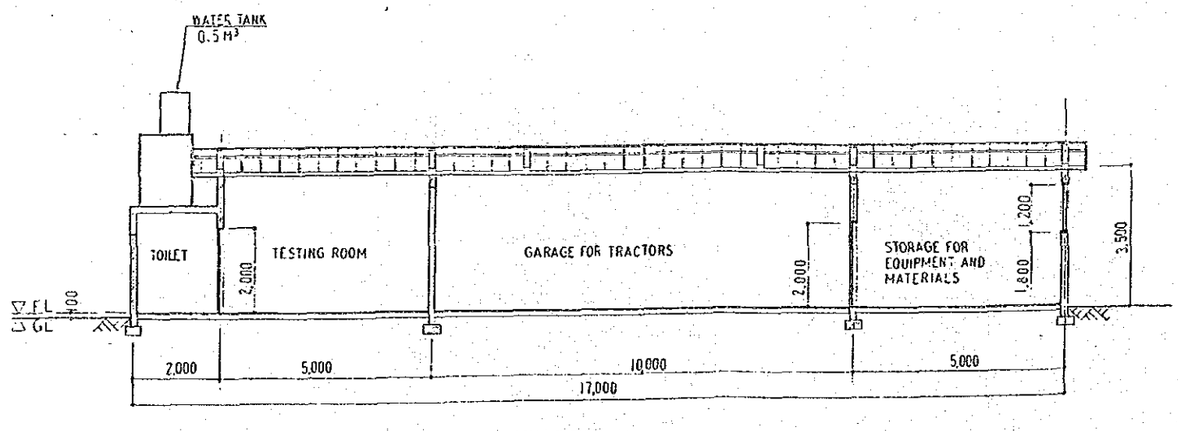
WATER TANK SECTION



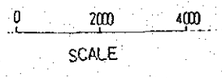
C-C' SECTION



REINFORCEMENT



SECTION



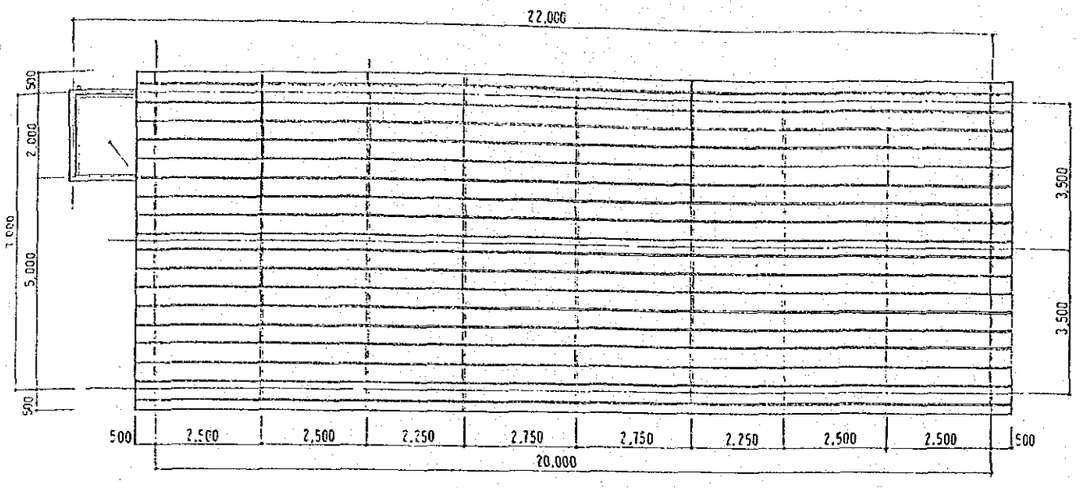
SCALE

GL= 37.50

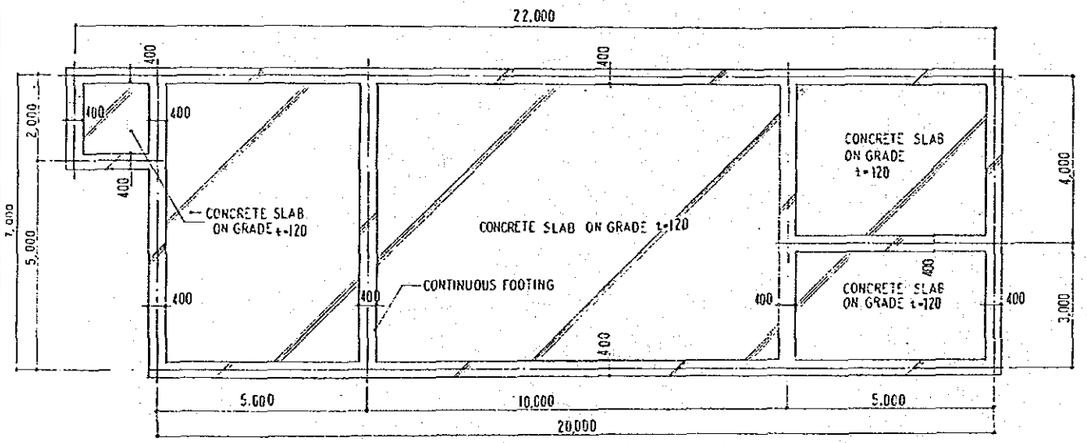
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

FIELD MANAGING HOUSE (1/2)

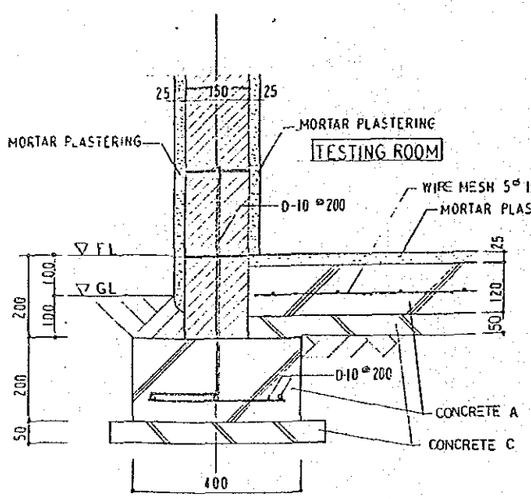
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 15



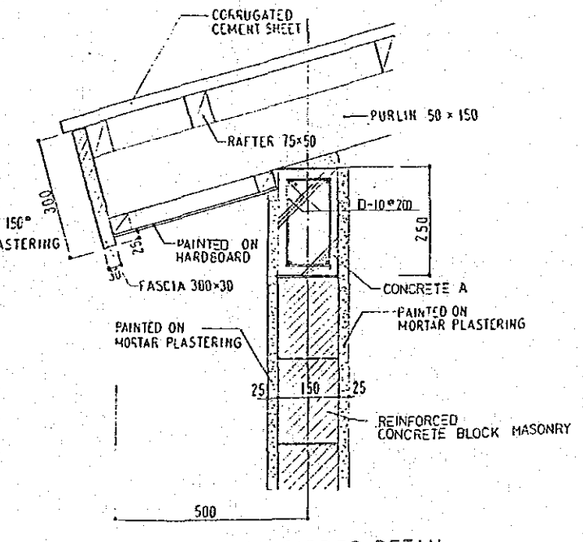
ROOF PLAN



FOUNDATION PLAN



FLOOR DETAIL



WALL GIRDER DETAIL

INTERIOR FINISHING SCHEDULE

BUILDINGS	ROOMS	FLOORS		SKIRTINGS	WALLS		CEILINGS	REMARKS
		FLOAT FINISH CONCRETE	MORTAR PLASTERING	MORTAR PLASTERING	MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING	PAINTED ON CEMENT BOARD	
FIELD MANAGING HOUSE	GARAGE	○			○		○	
	STORAGE	○			○		○	
	TESTING ROOM		○	○		○		
	TOILET		○	○		○		

EXTERIOR FINISHING SCHEDULE

BUILDINGS	SKIRTING	WALLS			ROOF		STRUCTURES					REMARKS
	MORTAR PLASTERING	MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING	STEEL GALVANIZED NET 20 MM MESH	CORRUGATED CEMENT SHEET	STEEL GALVANIZED NET 20 MM MESH	RC FOUNDATION	RC GRADE SLAB	STEEL STRUCTURE	CONCRETE BLOK MASONRY	STEEL ROOF STRUCTURE	WOODEN ROOF STRUCTURE	
FIELD M. HOUSE	○		○		○		○	○		○		○	

DOOR AND WINDOW SCHEDULE

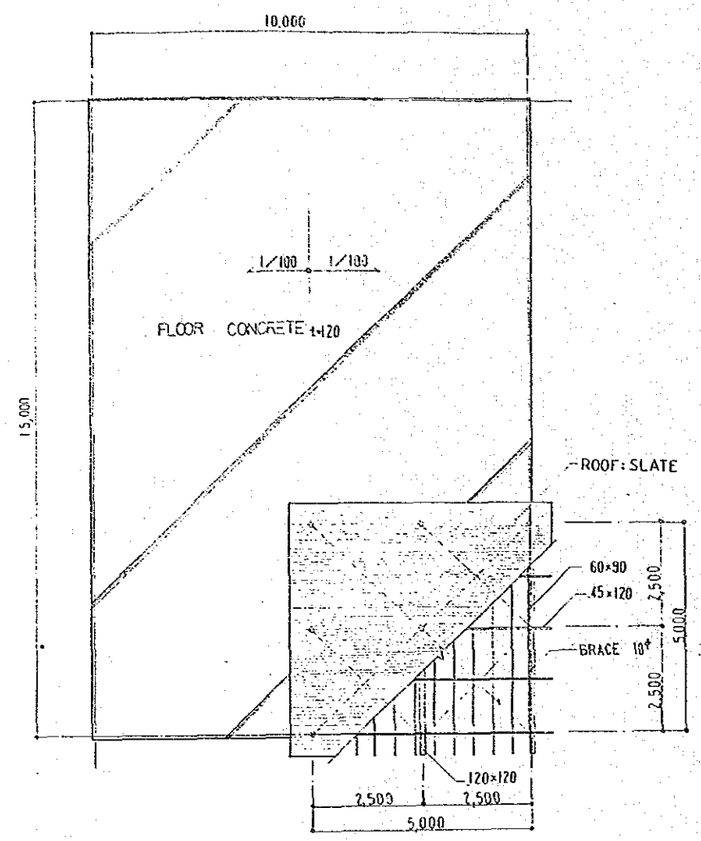
ITEM	DESCRIPTION	DIMENSION W×H
D-1	TOP-RAILED SLIDING DOOR	5.000 × 3.000
D-2	STEEL ANGLE FRAMED DOUBLE SWING DOOR	1.600 × 2.000
D-3	WOODEN FLUSH SWING DOOR	900 × 2.000
W-1	GLASS JALOUSIE WINDOW W/ STEEL LATTICE	900 × 1,200

NOTE, BEARING CAPACITY OF SOIL AT THE BOTTOM OF CONTINUOUS FOOTING SHALL BE 10 TON/M² OR MORE, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

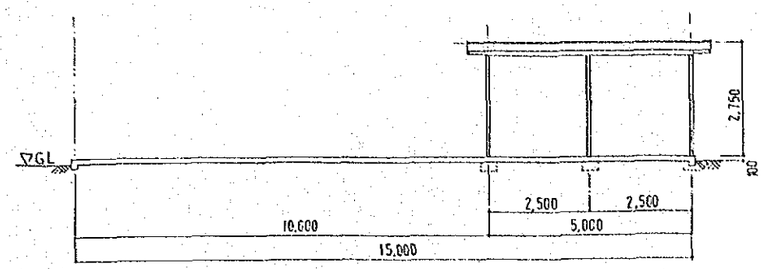
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

FIELD MANAGING HOUSE (2/2)

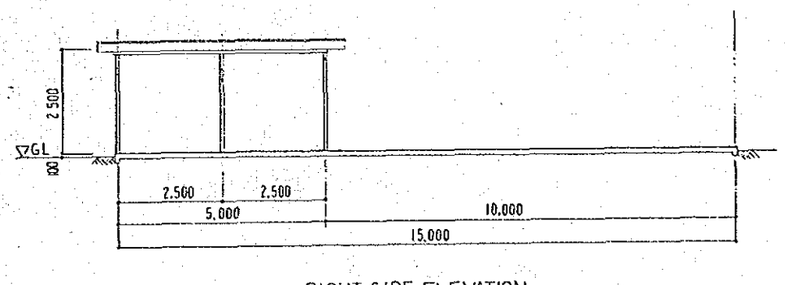
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 16



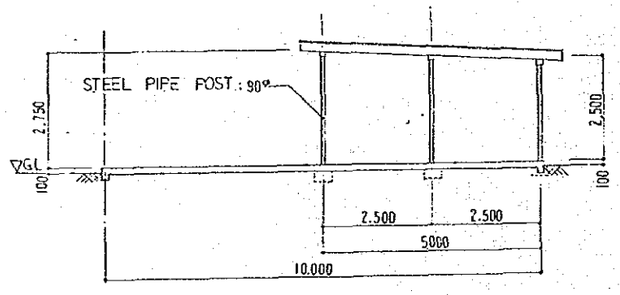
ROOF PLAN



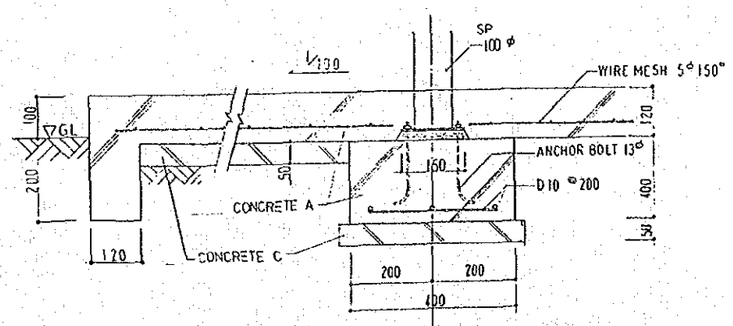
LEFT SIDE ELEVATION



RIGHT SIDE ELEVATION



FRONT ELEVATION

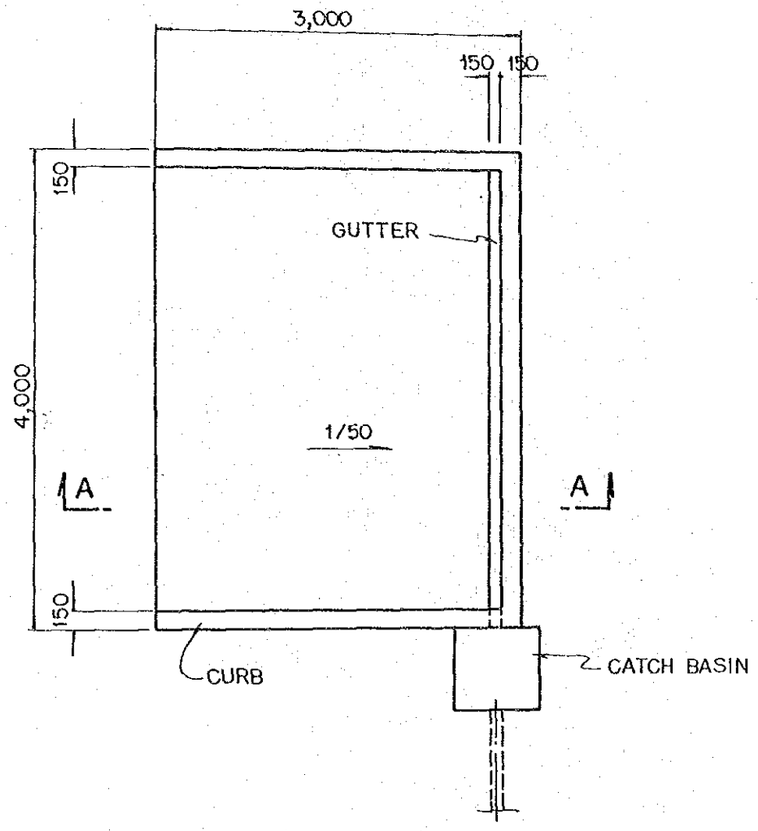


FLOOR AND FOUNDATION MINUTE

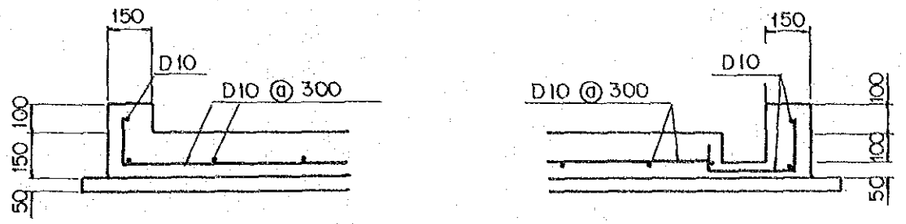
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

RICE DRYING YARD

JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 17

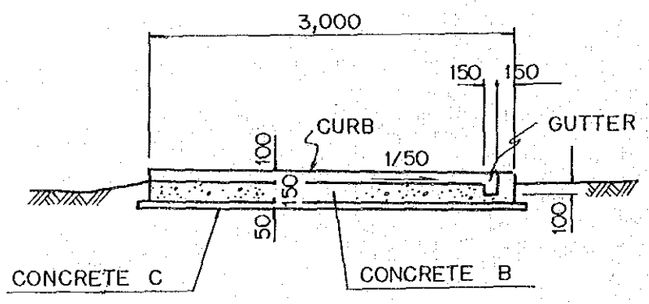


PLAN



REINFORCEMENT

SCALE
0 500 1,000 mm



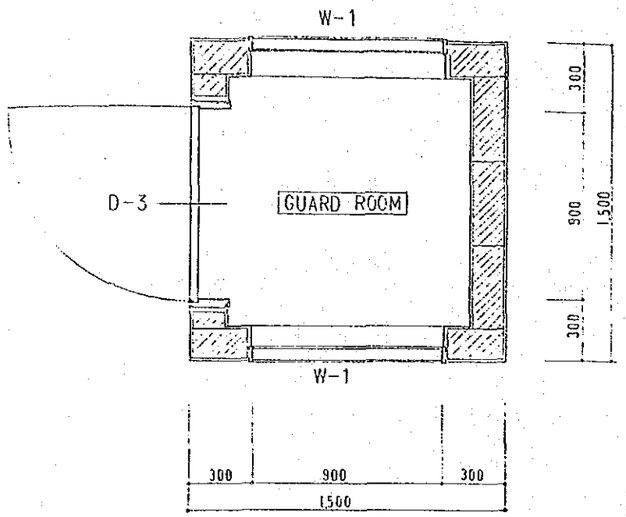
SECTION A-A

SCALE
0 1,000 2,000 mm

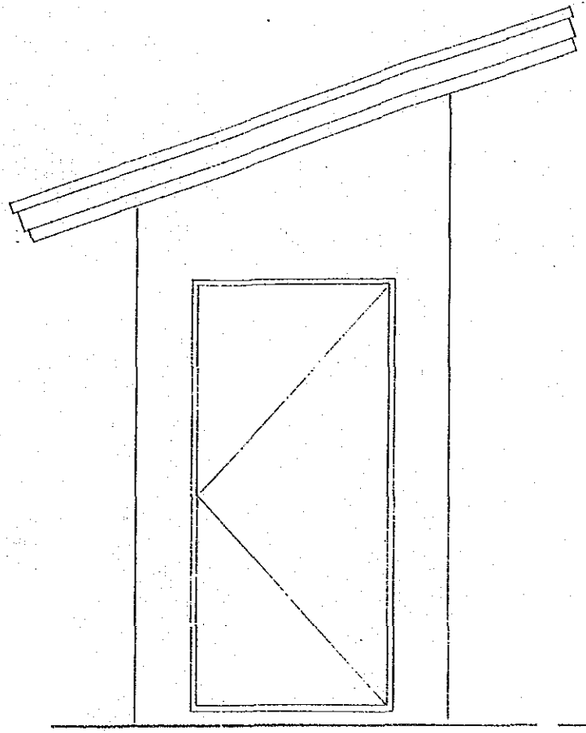
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

WASHING BAY FOR MACHINERY

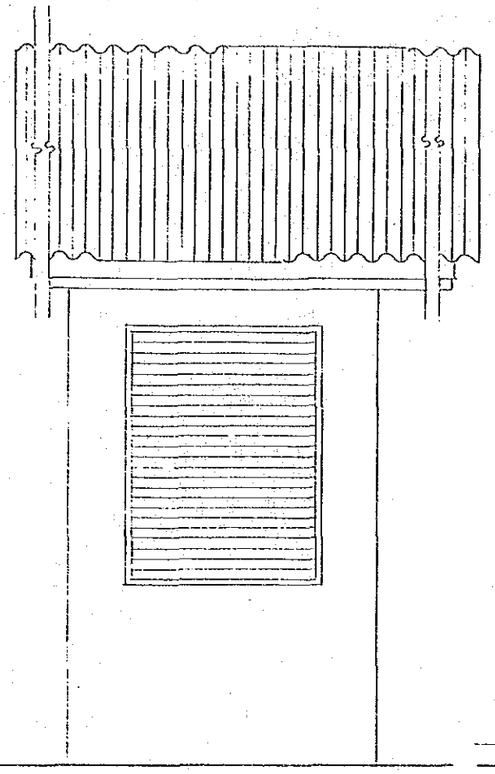
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 18



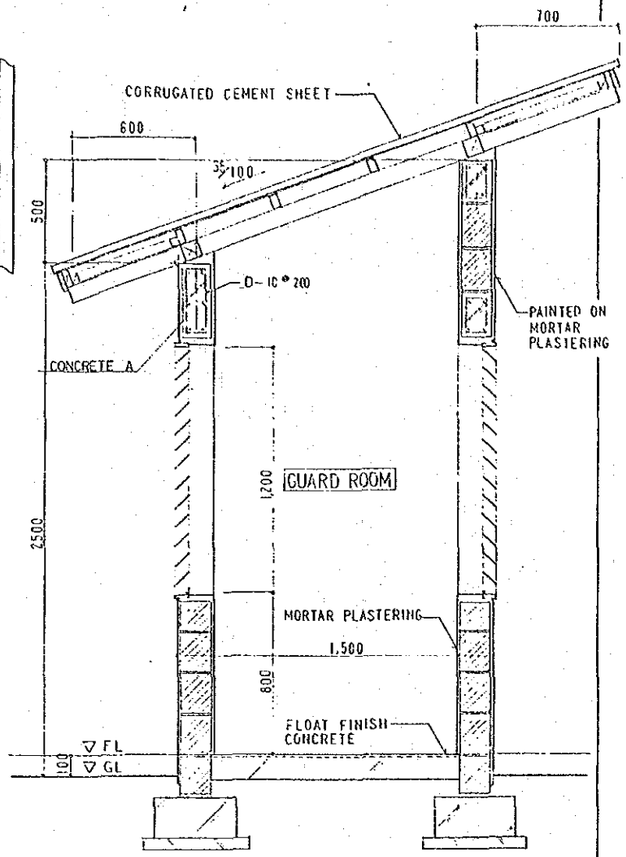
PLAN



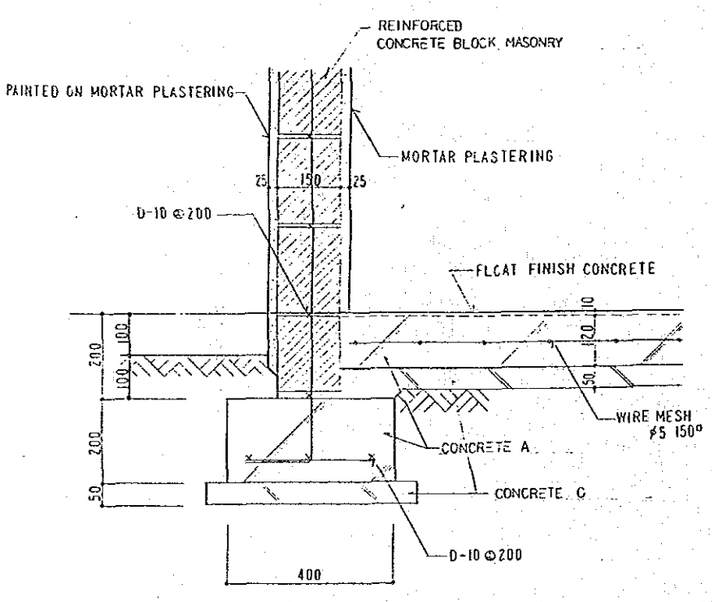
FRONT ELEVATION



SIDE ELEVATION



SECTION DETAIL



FLOOR AND FONDATION MINUTE

INTERIOR FINISHING SCHEDULE

BUILDINGS	ROOMS	FLOORS		SKIRTINGS		WALLS		CEILINGS		REMARKS
		FLOAT FINISH CONCRETE	MORTAR PLASTERING	MORTAR PLASTERING		MORTAR PLASTERING	MORTAR PLASTERING PAINTED ON MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING		
GUARD HOUSE	GUARD ROOM	○				○				

EXTERIOR FINISHING SCHEDULE

BUILDINGS	SKIRTINGS		WALLS			ROOF		STRUCTURES						REMARKS
	MORTAR PLASTERING		MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING	STEEL GALVANIZED NET 20MM MESH	CORRUGATED CEMENT SHEET	STEEL GALVANIZED NET 20MM MESH	RC FOUNDATION	RC GRADE SLAB	STEEL STRUCTURE	CONCRETE BLOCK MASONRY	STEEL ROOF STRUCTURE	WOODEN ROOF STRUCTURE	
GUARD HOUSE	○			○		○		○	○		○		○	

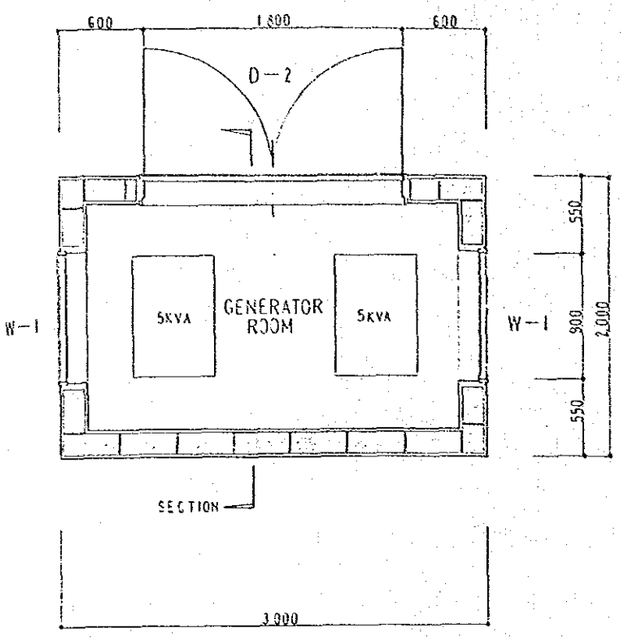
DOOR AND WINDOW SCHEDULE

ITEM	DESCRIPTION	DIMENSION W x H
D - 3	WOODEN FLUSH SINGLE SWING DOOR	900 X 2000
W - 1	GLASS JALOUSIE WINDOW	900 X 1200

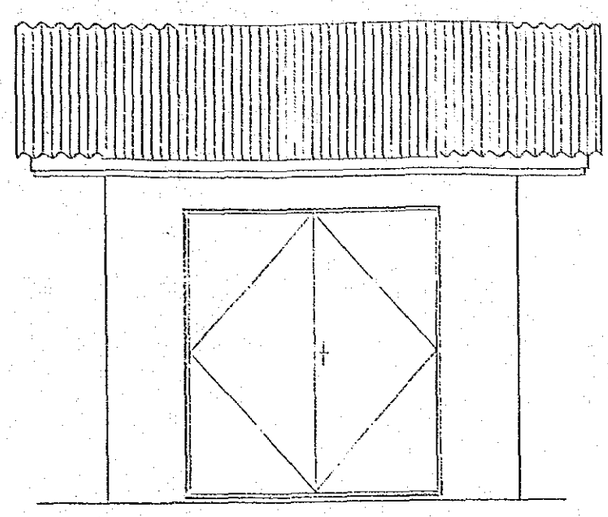
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

GUARD HOUSE

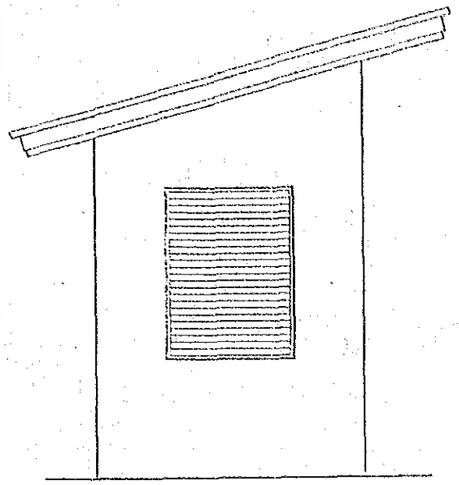
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 19



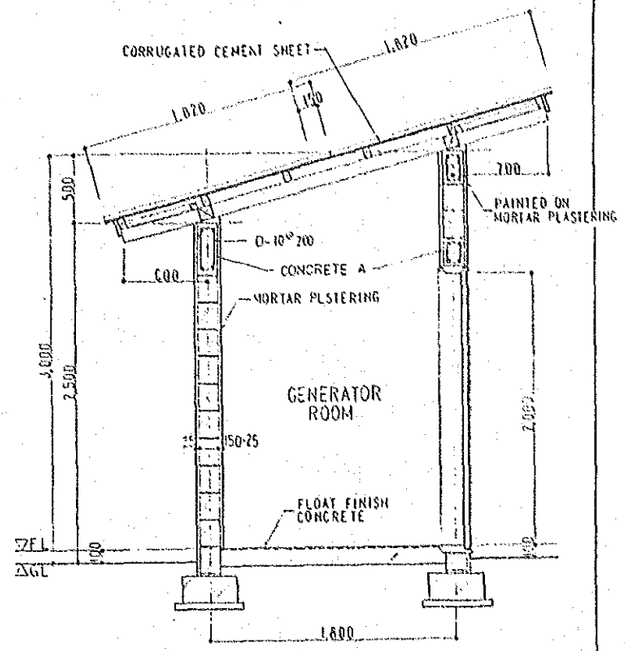
PLAN



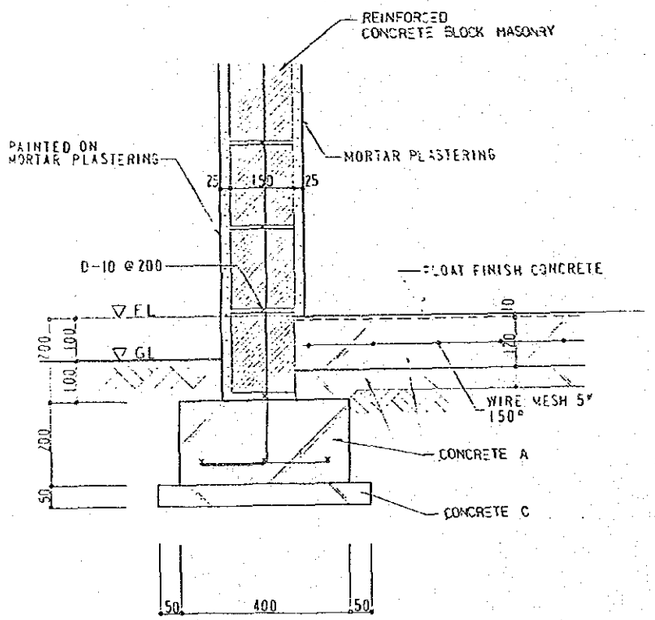
FRONT ELEVATION



SIDE ELEVATION



SECTION DETAIL



FLOOR AND FONDATION MINUTE

INTERIOR FINISHING SCHEDULE

BUILDINGS	ROOMS	FLOORS		SKIRTINGS			WALLS		CEILINGS		REMARKS
		FLOAT FINISH CONCRETE	MORTAR PLASTERING	MORTAR PLASTERING			MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING		
GENERATOR HOUSE	GENERATOR ROOM	○					○				

EXTERIOR FINISHING SCHEDULE

BUILDINGS	SKIRTINGS		WALLS			ROOF		STRUCTURES						REMARKS
	MORTAR PLASTERING		MORTAR PLASTERING	PAINTED ON MORTAR PLASTERING	STEEL GALVANIZED NET 20MM MESH	CORRUGATED CEMENT SHEET	STEEL GALVANIZED NET 20MM MESH	RC FOUNDATION	RC GRADE SLAB	STEEL STRUCTURES	CONCRETE BLOCK MASONRY	STEEL ROOF STRUCTURES	WOODEN ROOF STRUCTURES	
GENERATOR HOUSE	○			○		○		○	○		○		○	

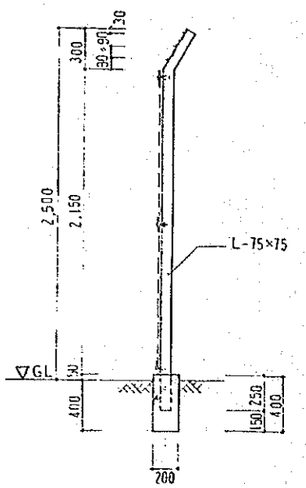
DOOR AND WINDOW SCHEDULE

ITEM	DESCRIPTION	DIMENSION W × H
D-2	STEEL ANGLE-FRAMED DOUBLE SWING DOOR	1,800 × 2,000
W-1	GLASS JALOUSIE WINDOW	900 × 1,200

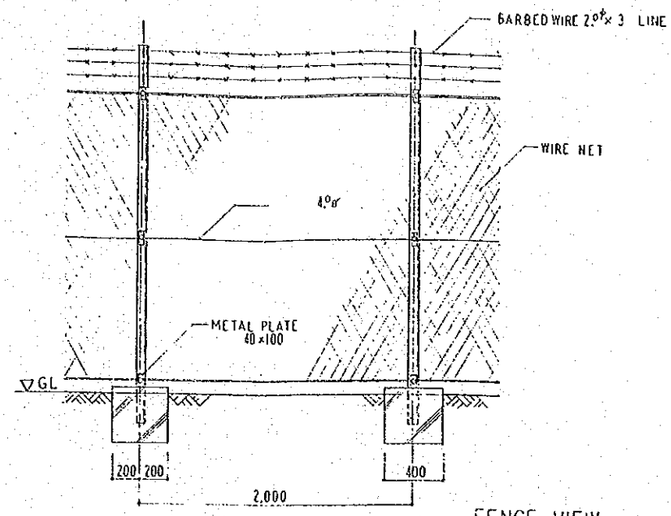
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

GENERATOR HOUSE

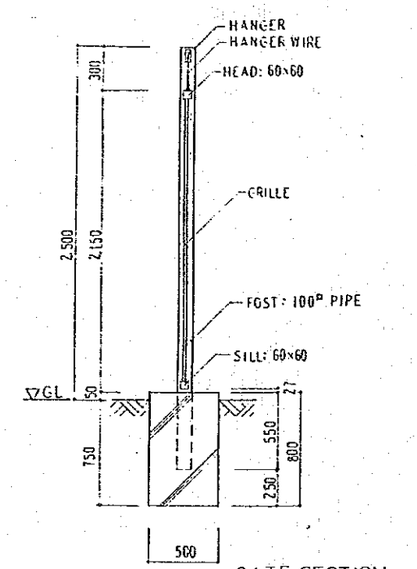
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 20



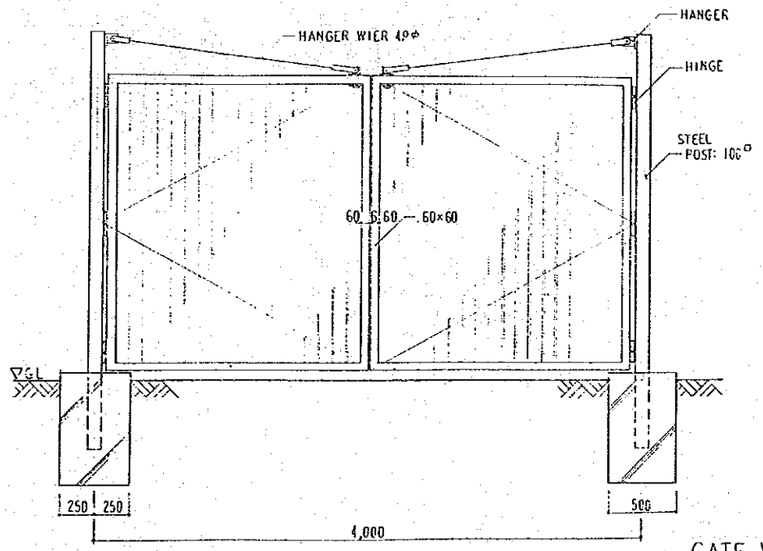
FENCE SECTION



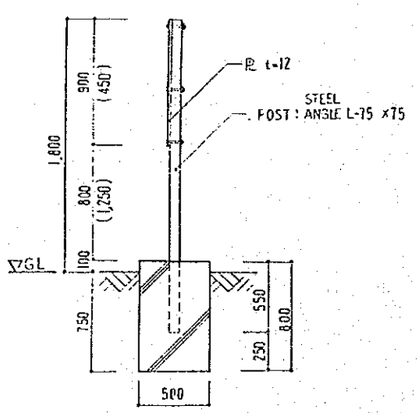
FENCE VIEW



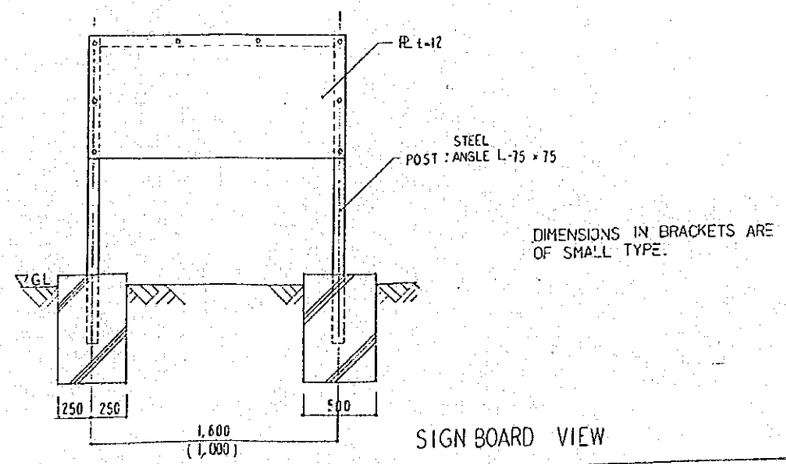
GATE SECTION



GATE VIEW

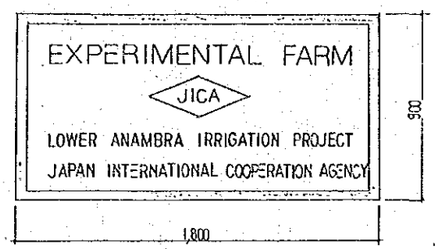


SIGN BOARD SECTION

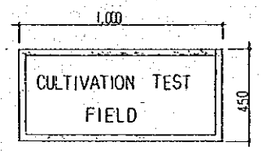


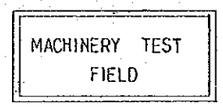
SIGN BOARD VIEW

DIMENSIONS IN BRACKETS ARE OF SMALL TYPE.



MAIN SIGN BOARD





SMALL TYPE BOARD

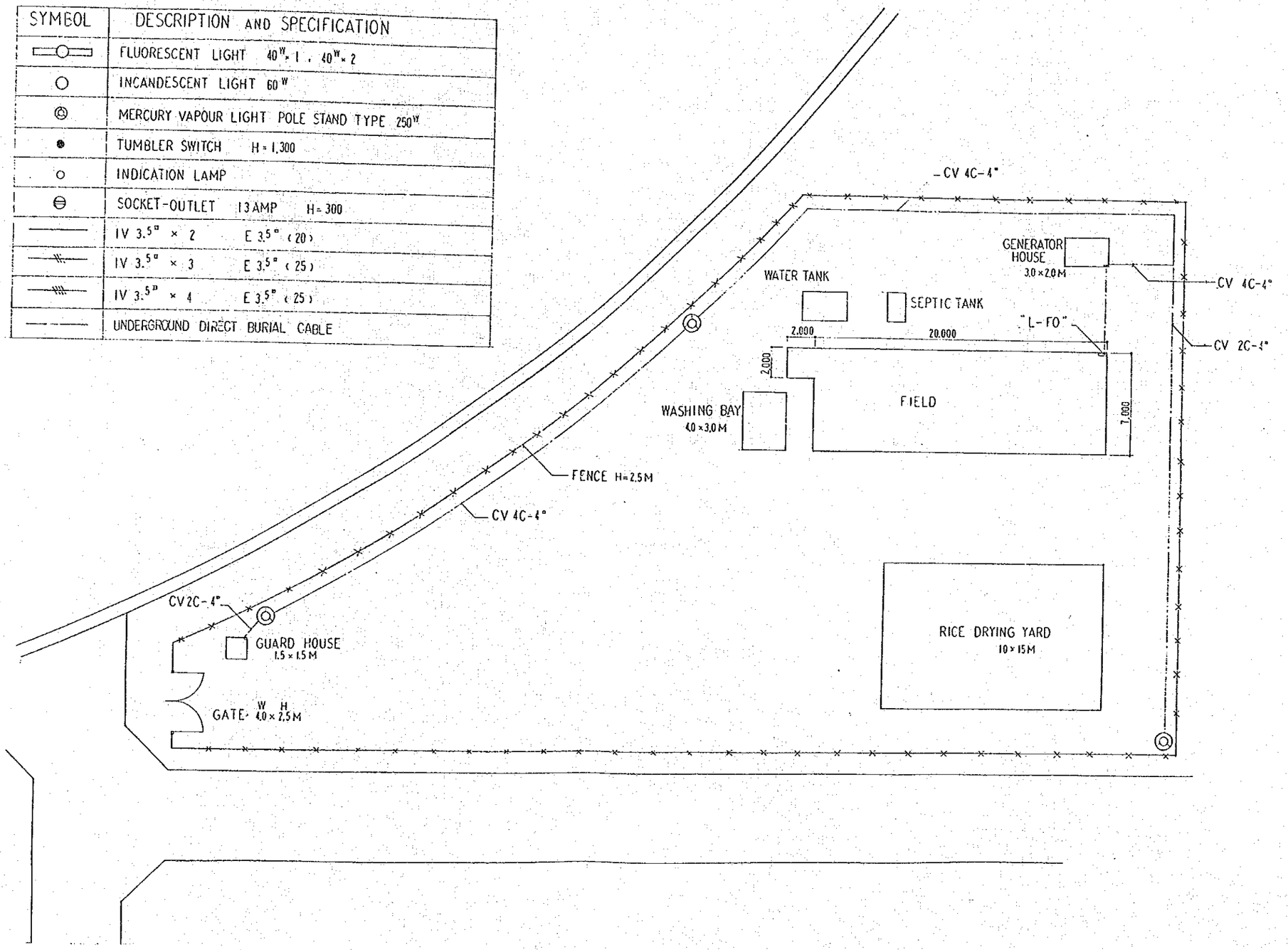
FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

FENCE, GATE AND SIGN BOARD

JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 21

LEGEND

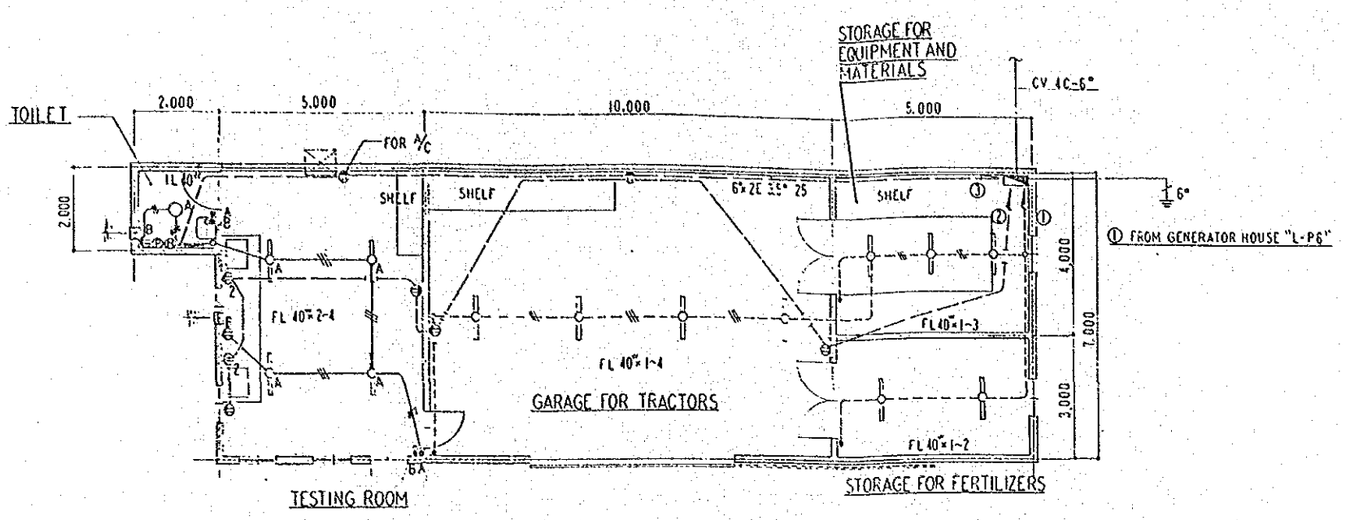
SYMBOL	DESCRIPTION AND SPECIFICATION
⊏○⊐	FLUORESCENT LIGHT 40W × 1 , 40W × 2
○	INCANDESCENT LIGHT 60W
⊗	MERCURY VAPOUR LIGHT POLE STAND TYPE 250W
●	TUMBLER SWITCH H = 1,300
○	INDICATION LAMP
⊖	SOCKET-OUTLET 13AMP H = 300
———	IV 3.5ᵐᵐ × 2 E 3.5ᵐᵐ (20)
——//——	IV 3.5ᵐᵐ × 3 E 3.5ᵐᵐ (25)
——///——	IV 3.5ᵐᵐ × 4 E 3.5ᵐᵐ (25)
— — —	UNDERGROUND DIRECT BURIAL CABLE



FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

ELECTRIC INSTALLATION (1/2)

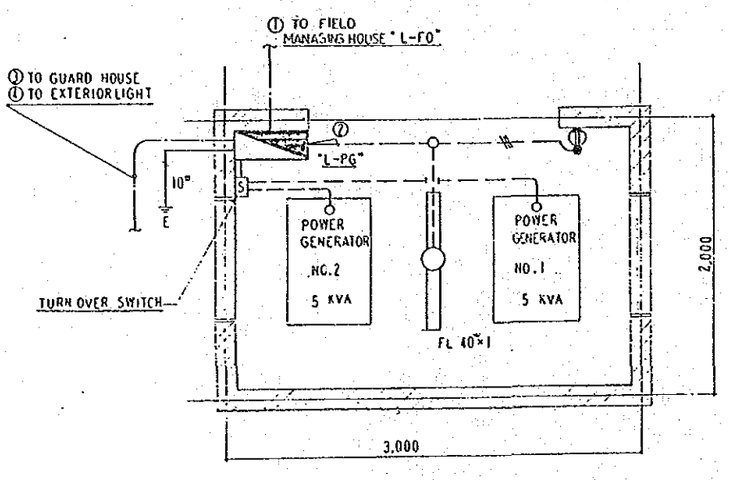
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 22



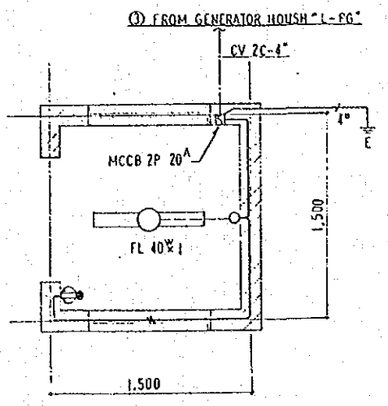
FEILD MANAGING HOUSE ELECTRICAL PLAN

LEGEND

SYMBOL	DESCRIPTION AND SPECIFICATION
	FLUORESCENT LIGHT 40W×1 40W×2
	INCANDESCENT LIGHT 60W
	MERCURY VAPOUR LIGT POLE STAND TYPE 250W
	TUMBLER SWITCH H=1.300
	INDICATION LAMP
	SOCKET-OUTLET 13AMP H=300
	IV 3.5"×2 E 3.5 (20)
	IV 3.5"×3 E 3.5 (25)
	IV 3.5"×4 E 3.5 (25)
	WIREING CONCEALED IN CEILING OR WALL
	WIREING CONCEALED IN FLOOR
	WIREING EXPOSED
	PANEL BOARD



GENERATOR HOUSE ELECTRICAL PLAN

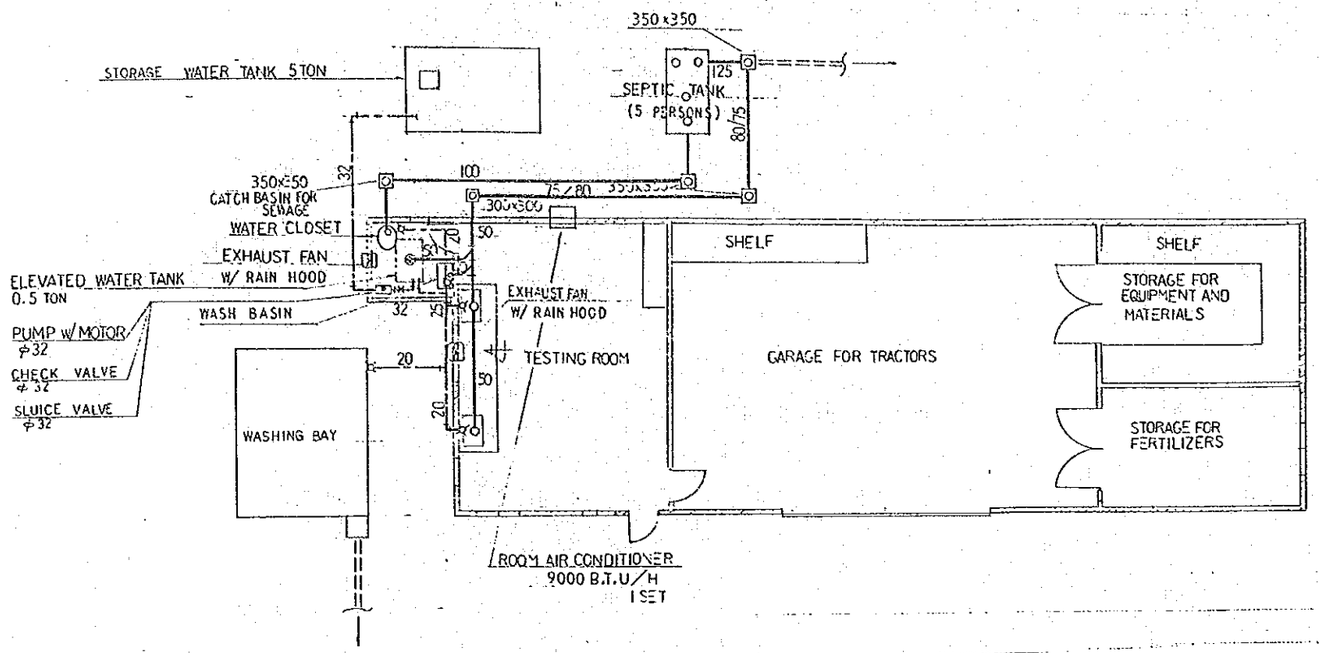


GUARD HOUSE ELECTRICAL PLAN

FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

ELECTRIC INSTALLATION (2/2)

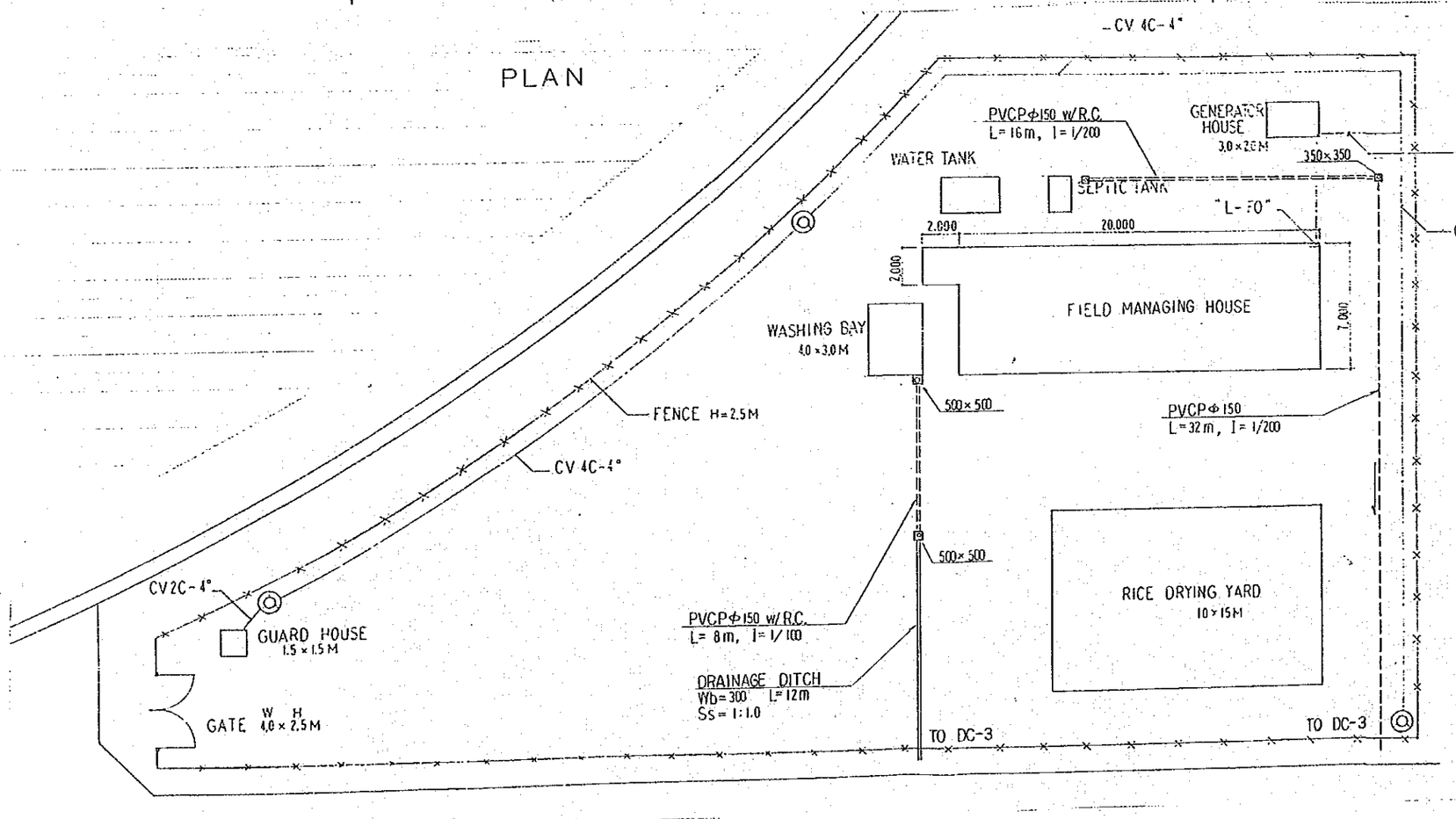
JAPAN INTERNATIONAL COOPERATION AGENCY | DWG NO. 23



LEGEND

SYMBOL	DESCRIPTION
	FAUSET
	DRAIN OUTLET
	FLOOR DRAIN
	SLUICE VALVE
	CHECK VALVE
	CATCH BASIN FOR DRAINAGE/SEWARAGE
	WATER SUPPLY PIPE, GALVANIZED SP
	DRAINAIGE/SEWARAGE PIPE, PVCP
	DITTO W/PROTECTION CONCRETE
	DITTO W/SAND BED
	DRAINAGE DITCH

PLAN



FEDERAL REPUBLIC OF NIGERIA
THE LOWER ANAMBRA IRRIGATION PROJECT
MODEL INFRASTRUCTURE IMPROVEMENT WORKS

PLUMBING INSTALLATION

JAPAN INTERNATIONAL COOPERATION AGENCY | DWG. NO. 24

CHAPTER 7 OTHER RELATED DATA, ARTICLE AND DOCUMENTS

7.1 Members' List of Detailed Design Survey Team

Mr. Kenji YOSHINAGA	Team Leader
Mr. Noriharu USUKI	Coordinator
Mr. Takashi KURAUCHI	Design Engineer
Mr. Hiroshi KANDA	Design Engineer

7.2 Itinerary of Detailed Design Survey Team

Date	Activity
1988	
Oct. 31 (Mon)	Leaving Tokyo for Amsterdam
Nov. 1 (Tue)	Arriving at Amsterdam
2 (Wed)	Leaving Amsterdam for Lagos
3 (Thu)	Visit to Embassy of Japan Meeting with the Implementation Survey Team
4 (Fri)	Leaving Lagos for the Project Site
5 (Sat)	Site Survey
6 (Sun)	Meeting with Japanese Long-term Survey Team and Draft Basic Plan Preparation
7 (Mon)	Meeting with Anambra-Imo River Basin Development Authority (AIRBDA)
- M/S Yoshinaga and Usuki -	
8 (Tue)	Leaving the Project Site for Lagos
9 (Wed)	Visit to Embassy of Japan
10 (Thu)	Leaving Lagos for Copenhagen
11 (Fri)	Arriving at Copenhagen
12 (Sat)	Leaving Copenhagen for Tokyo
13 (Sun)	Arriving at Tokyo
- M/S Kurauchi and Kanda -	
8 (Tue) to 23 (Wed)	Site Survey, Data Collection, Basic Design, Cost Estimate and Meeting with AIRBDA
24 (Thu)	Leaving the Project Site for Lagos
25 (Fri)	Visit to Embassy of Japan
26 (Sat)	Leaving Lagos for London
27 (Sun)	Arriving at London
28 (Mon)	Leaving London for Tokyo
29 (Tue)	Arriving at Tokyo

7.3 Letter List of Detailed Design Survey Team

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)
DETAILED DESIGN SURVEY TEAM
FOR
THE LOWER ANAMBRA IRRIGATION PROJECT

November 7, 1988

General Manager
Anambra-Imo River Basin
Development Authority
P.M.B. 1301
Owerri

Dear Sir,

Re: The Model Infrastructure Improvement Works
for the Lower Anambra Irrigation Project

The Detailed Design Survey Team has been organized by Japan International Cooperation Agency (JICA) for the purpose of formulating detailed plan on the Model Infrastructure Improvement Works for the Lower Anambra Irrigation Project.

The Team has, so far, made a series of site reconnaissances and discussions with your staff concerned in order to determine the location and scale of the experimental farm and its facilities. As the result, we would like to submit to you the tentative idea for designing of the experimental farm as per the attached.

Two team members, Mr.Kurauchi and Mr.Kanda, will proceed with your staff to conduct further field surveys and investigations at the site and make the detailed design on the basis of the result of those surveys. After the completion of the detailed design and assessment of its cost estimated by JICA, you will be informed of its result through the Embassy of Japan.

For the timely commencement of the construction of the experimental farm. we would like to ask you to take the necessary formalities in due consultation with the Embassy of Japan.

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

Sincerely Yours,

Kenji YOSHINAGA
Team Leader
Detailed Design Survey Team
Japan International
Cooperation Agency

cc:Secretary
Development Aid Department
Office of Planning and Budget
in the Office of the President
(Att:Mr.B.A.Adeusi)
cc:Director General
Federal Ministry of Agriculture,
Water Resources and Rural Development
(Att:Alh.A.M.Dauda)
cc:Embassy of Japan

1.Objective

This survey is to carry out the detailed design on the experimental farm to be constructed by the Japanese government based upon the Record of Discussions, Article IV (1) signed between both Governments on November 3, 1988.

The experimental farm will be composed of fields for such as cultivation test, demonstraion, training and mechanization, which involves the construction of land-leveling, irrigation and drainage canals, farm roads, etc. And, besides, the experimental farm, also, equip those facilities such as field managing house for agricultural machinery, fertilizer and pesticide and rice drying yard.

The experimental farm will be a core for the activities of the technical cooperation, through which not only the various activities mentioned in the Master Plan will be conducted but also skills and techniques developed will be transferred and disseminated to the farmers.

In light of the above, the team conducted the surveys on selection of site, scale of farm, condition of access road and water resource and had preliminary discussions on the framework of experimental farm.

2.Location and Scale

(1)The location of the experimental farm is planned in consideration of following conditions.

a)access from the project office
b)condition of irrigation water
c)efficiency for demonstration
d)advantage of construction cost

Considering the above, the experimental farm is selected at the area near to the turnout TO-W7 as shown in Fig-1 and 2.

(2)The area of the experimental farm is about 4.5ha including the facility yard as shown in Fig-3.
The experimental farm consists of as follows,

a)cultivation test field
b)demonstration field
c)machinary test field
d)training field
e)field managing house, rice drying yard, etc.

3.Components of Experimental Farm

Experimental Farm

The experimental farm consists of the following facilities.

(1)Irrigation canal

a)Intake
Irrigation water for the experimental farm will be intaken from the West Main Canal at the turnout TO-W7.

b)Irrigation canal
The approach canal (TC-W7-1) from the intake and the distribution canal (DC-W7-1-2) running inside of the experimental farm will be reinforced by concrete lining or concrete block.

(2)Drainage canal

The exiting drains will be used with minor improvement.

(3)Road

In addition to the existing farm road, roads surrounding the experimental farm will be newly constructed for easy approach by machinery and for maintenance work.

(4)Field

The area of the experimental fields will be about 4ha. The farm consists of the following four kinds of field.

a)Cultivation test field
The cultivation test field will be 2 plots (about 1ha). The field will be divided into 8 sub-plots for activities such as rice variety test, fertilizer test and insectcide test. This field will equip the concrete levee and bird scaring net, if necessary.

b)Demonstration field
The demonstration field will be 2 plots (about 1ha). Through this field, the skills and techniques will be extended to farmers.

c)Machinery test field
The machinery test field will be 2 plots (about 1ha). In this field, adaptability test and operation of the machinery will be conducted.

d)Training field
The training field will be 2 plots (about 1ha). This field will be used for various trainings to personnel concerned.

Farm Facilities

In order to manage and maintain the experimental farm, the following facilities will be constructed.

(1)Field managing house

The field managing house will equip those such as (i)storage for fertilizer, pesticide, farm equipment, etc., (ii)garage for agricultural machinery and (iii)test room. Small-scale water supply tank, portable generator and washstand for agricultural machinery will be facilitated outside the house.

(2)Rice drying yard

In order to dry the rice, the rice drying yard is facilitated.

(3)Fence and guard house

Fence will be installed around the farm facilities and guard house will be built at the entrance.

4.Others

(1)The Nigerian side will provide the land for the experimental farm.

(2)The tentative schedule and procedure for the construction work of experimental farm is shown in Table-1.

Table-1

OUTLINE OF THE TENTATIVE SCHEDULE ON THE MODEL INFRASTRUCTURE IMPROVEMENT WORK

	Japanese Side	Nigerian Side
1988		
Nov.	Detailed design survey --Nov.2 to Nov.26--	To provide land for the experimental farm
Dec.		
1989 Jan.	Detailed design work in Japan	
Feb.	Submission of final report ———	
Mar.		
Apr.		Request of construction work for the experimental farm (to the team leader)
	JICA HDQ	
May.	———	Submission of A1 form for expert (to the Embassy of Japan)
Jun.		
Jul.		
Aug.	Exchange of Note Verbale	
Sep.	Dispatch of supervising expert	
	Remittance of budget	
	Contract for construction	
Oct.	Start of construction work	

FIG 1 LOCATION MAP

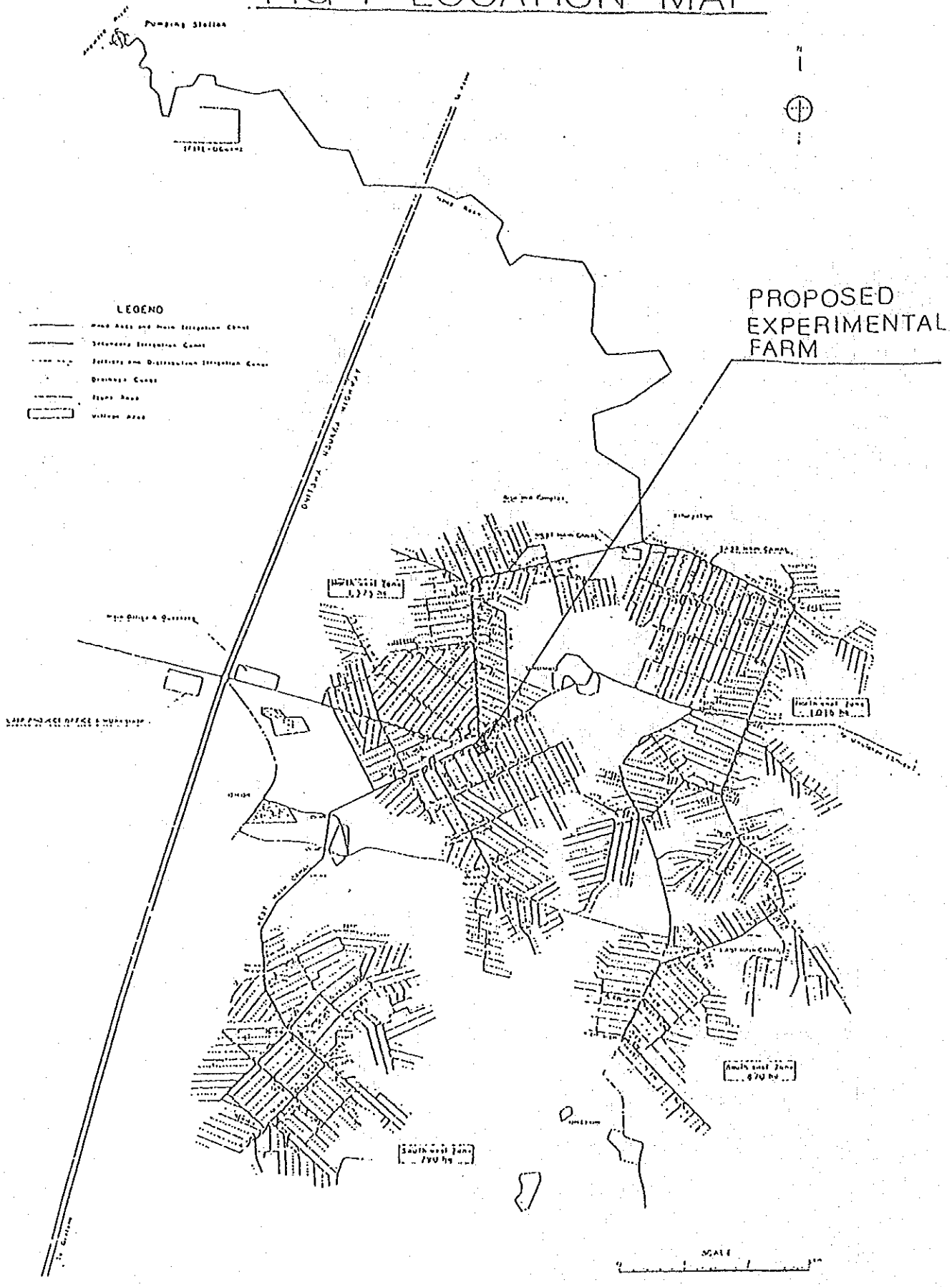


FIG. 2 PLOT NUMBER

TO-W7 AREA

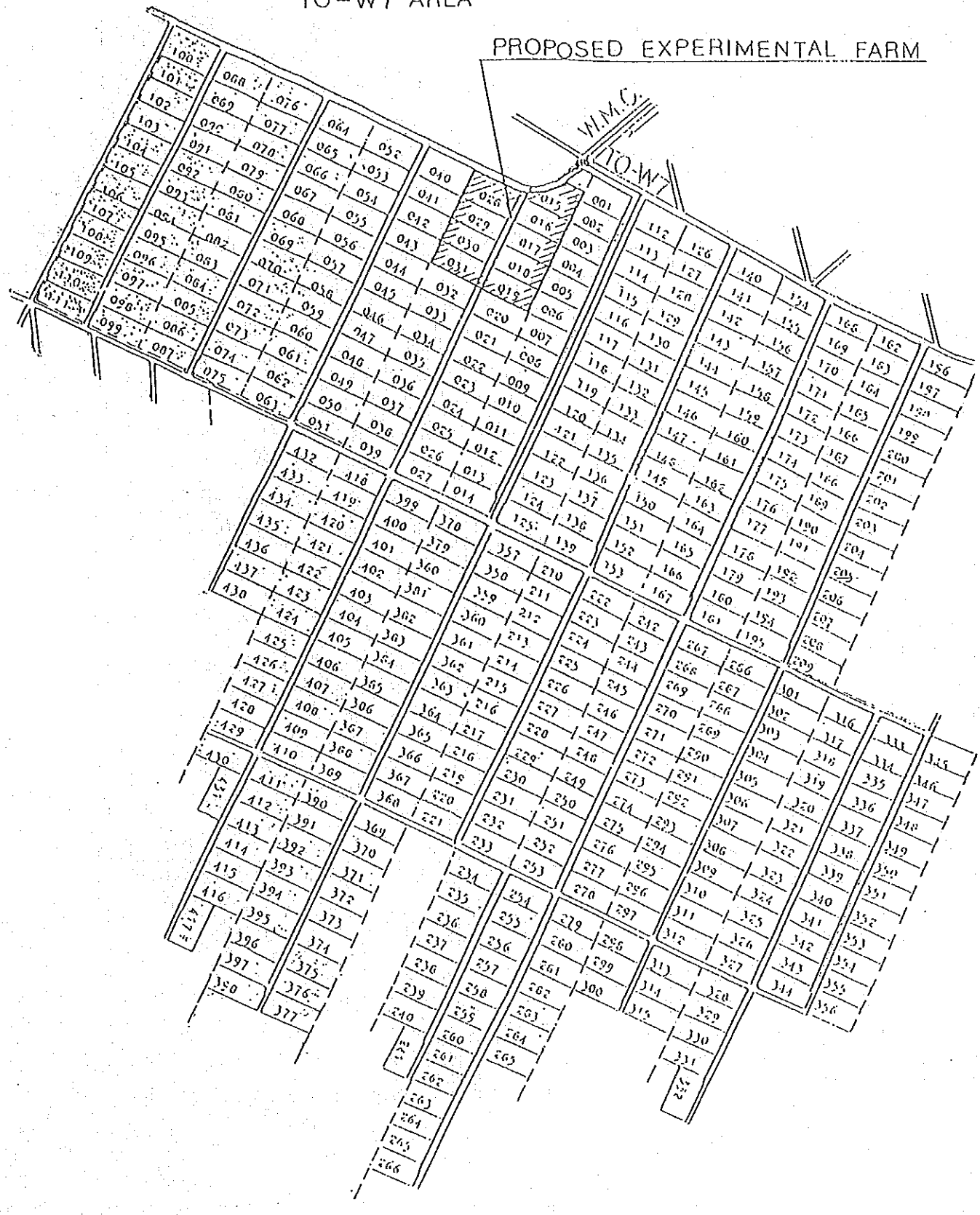
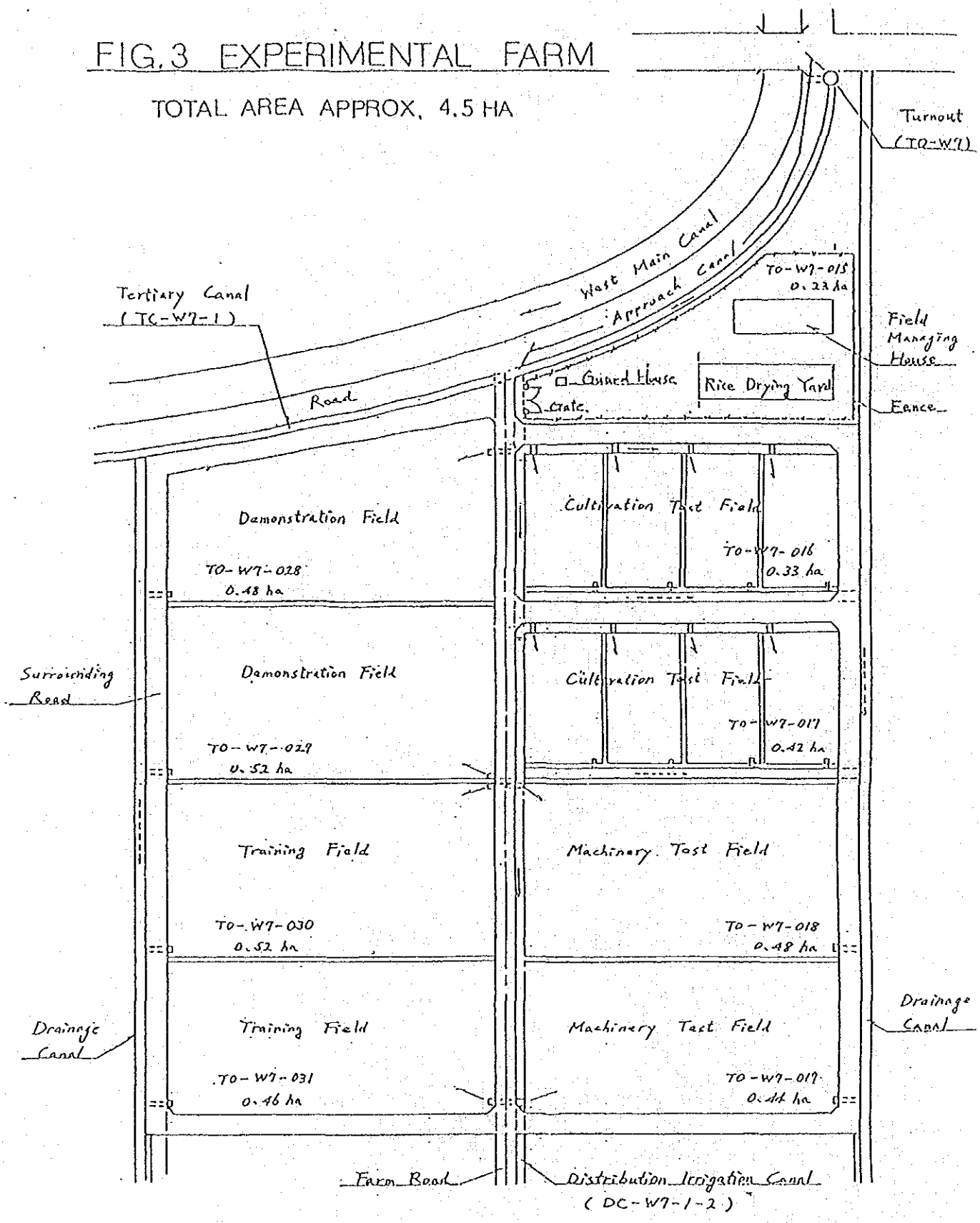


FIG. 3 EXPERIMENTAL FARM

TOTAL AREA APPROX. 4.5 HA



November 9, 1988

General Manager
Anambra-Imo River Basin
Development Authority,
Owerri

Attention : Assistant General Manager
(C.O. & M.)

Dear Sir,

L.A.I.P./Technical Assistance Program JICA

Collection of Necessary Data and Information
Concerning Detailed Design of Model Infrastructure Works

We, the Detailed Design Team of JICA wish to send you herewith the questionnaires regarding the captioned. So, please pre-study these questions prior to our discussion. We will visit you on 10th November, as schedule.

Your understanding and particular attention to the captioned are kindly requested.

Sincerely Yours,

T. Kurauchi

T.Kurauchi
for Team Leader
Detailed Design
Survey Team
JICA

cc. File

Questionnaire

1. Please let us know the standard schedule and procedure which are generally accepted in Nigeria in selection of the contractor.

2. Do you have any specific limitation or authorized conditions in performance of the design and/or the construction works?

3. Please let us know the standard criteria and/or engineering standard to be authorized in Nigeria. For example, which standard is applied to the concrete works in Nigeria?

4. Please prepare the short list of three to four competent local contractors.

   Construction of the experimental farm (4.5ha) will include both civil (land consolidation works) and architectural works (construction of field office), and it will be required high quality works.

   The contractors to be selected must have deep enough experiences in similar to the proposed works and have the working capacity to complete the said works within five months. The outline of construction work is as shown in attachment 1.

5. To carry out the proposed construction works, the contractor will have to utilize the heavy duty equipment so as to enable quality work as well as to complete the works as short time as possible (maximum 5 months). To this end, if the contractor have no enough equipment, is it possible to get lease service of equipment(O/M equipment) from your Authority?

6. To carry out the design works, and then, to estimate the construction cost efficiently and satisfactorily, please provide us the relavant data and information on unit prices and/or costs which are applied to the current works under your administration (see Attachment 2).

Attachment 1

Outline of the Experimental Farm (tentative)

Descriptions		Remarks
Gross area	4.5ha	
Farm plots	4 ha	(to be made and levelling by motor grader)
Irrigation canal		
existing	400 m	(to be concrete lining)
additional construction	200 m	(to be concrete lining)
Drainage canal		
existing	600 m	
Road		
existing	250 m	(to be improved by additional embankment and gravel pavement)
additional construction	800 m	(to be constructed by embankment and gravel pavement)
Bird scaring net	750 m2	
Embankment for office yard	500 m3	
Pavement in office yard	1000 m2	
Field office	140 m2	
Rice drying yard	400 m2	
Guard house	1 no.	
Gate	1 set	
Fence	300 m	
Water tank	3 m3	
Generator	2 sets	
Water supply system	L.S.	
Electricity supply system	L.S.	

Attachment 2

Unit Price

1. Labour cost

Item	Unit	Unit Price	Condition
Common labour	m.d	_____	
Skilled labour	m.d	_____	
Foreman	m.d	_____	
~~Concrete~~ worker	m.d	_____	
Steel worker	m.d	_____	
Carpenter	m.d	_____	
Painter	m.d	_____	
Plumber	m.d	_____	
Blacksmith	m.d	_____	
Mason	m.d	_____	
Operator for equipment	m.d	_____	
Operator for truck	m.d	_____	

2. Material price

Item	Unit	Unit Price	Condition
Sand	m3	_____	at quarry or at site
Gravel	m3	_____	
Stone	m3	_____	
Laterite	m3	_____	
Timber	m3	_____	
Cement	kg,t,bag	_____	
Reinforcement steel bar	kg,t	_____	
Structural steel	kg,t	_____	
Steel wire	kg,t	_____	
Steel net for fence	kg,m2	_____	
Steel net for bird scaring	kg,m2	_____	
Steel pipe			
dia. 20mm	m,nos.	_____	
dia. 25mm or 1"	m,nos.	_____	
dia. 50mm or 2"	m,nos.	_____	
dia. 100mm or 4"	m,nos.		
Reinforced concrete pipe			
dia. 200 mm	m,nos.	_____	

dia. 300 mm	m,nos.	_____
dia. 400 mm	m,nos.	_____
dia. 500 mm	m,nos.	_____
dia. 600 mm	m,nos.	_____
PVC pipe		
dia. 50 mm	m,nos.	_____
dia. 100mm	m,nos.	_____
dia.200mm	m,nos.	_____
Generator 5KVA	set	_____
Water tank	m3	_____

3. Unit cost for works

Work Item	Unit	Unit Cost
Excavation by manpower	m3	_____
Excavation by bulldozer	m3	_____
Excavation by hydraulic shovel	m3	_____
Excavation by backhoe	m3	_____
Embankment by manpower	m3	_____
Embankment by bulldozer	m3	_____
Backfill by manpower	m3	_____
Backfill by bulldozer	m3	_____
Land levelling by bulldozer	m3	_____
Land levelling by motor grader	m3	_____
Stripping	m3	_____
Hauling by Truck	m3*km	_____
Sod facing	m2	_____
Gravel pavement ,t=100 mm	m2	_____
Laterite pavement, t=100 mm	m2	_____
Asphalt pavement , t= 50 mm	m2	_____
Concrete , upper class	m3	_____
Concrete , middle class	m3	_____
Concrete , lower class	m3	_____
Formwork	m2	_____
Reinforcement	kg, t	_____
Warehouse (fair quality)	m2	_____
Generator installation	set	_____
Fence, steel net H=2,5m	m	_____
Roof, currugated tin or galvanized iron	m2	_____

November 24, 1988

General Manager
Anambra-Imo River Basin
Development Authority,
Owerri

Dear Sir,

L.A.I.P./Technical Assistance Program JICA
Detailed Design of Model Infrastructure Works

We would like to inform you that our field survey for the captioned has completed on schedule and we will leave Nigeria on 26th November. We thank you very much for your kind cooperation during our stay. We could have your significant comments, advices and suggestions at site and at your office.

We will complete the detailed design and draft tendr documents by the end of January, 1989 in accordance with the proposed schedule. In future construction stage, of which period is scheduled to be only about six months including some administrative procedures, you are kindly requested to give us further cooperation for smooth and successful construction of the experimental farm.

Sincerely Yours,

T.Kurauchi
for Team Leader
Detailed Design
Survey Team
JICA

cc. AGM (COM)
Area Manager
Project Manager
Team Leader, NK
File

November 22, 1988

List of Field Surveys for Detailed Design of Model Infrastructure Works (JICA)

1. Field Reconnaissance

2. Physical Data Collection
   (inc. daily rainfall, design values and soil condition)

3. Investigation of Existing Site Conditions
   (inc. field, irrigation, drainage and road)

4. Preliminary Layout of Experimental Farm
   (refer to Fig. 1, 2 and 3)

5. Topographic Survey
   (inc. route survey, levelling and plane table survey)

6. Bearing Capacity Test
   (by corn penetrometer in facility yard)

7. Price Investigation
   (inc. material price and labour cost)

8. Investigation on Construction, Contract and Market Condition

9. Preliminary Work Quantity Estimate

Outline of the Experimental Farm (tentative)

1. Civil Works

(1)	Road	1:ex. 250m, new 900m total 1,150m
(2)	Irrigation canal	1:ex. 400m, new 150m total 550m
(3)	Drainage canal	1:ex. 450m, new 200m total 650m
(4)	Canal related structures	division box 16nos, outlet 16nos culvert 15nos
(5)	Farm land levelling	4ha
(6)	Concrete border	1: shaped 300m, lining 600m total 900m
(7)	Facility yard preparation	1,000m2

2. Building and Related Facilities

(1)	Field office	144m2
(2)	Drying yard	150m2
(3)	Gurad house	2.3m2
(4)	Generator house	6.0m2
(5)	Bird scaring net	750m2
(6)	Gate, fence and sign board	1set, 300m2
(7)	Carwash	12m2
(8)	Electricity supply system	
(9)	Water supply and sewerage systems	
(10)	Air conditioning and ventilating systems	

Preliminary Work Quantitv Esimate (tentative) (1/2)

Items	Unit	Quantity
1. Civil Works		
(1) Road		
Stripping	m3	240
Excavation	m3	220
Embankment(Lat.)	m3	2,500
Gravel pavement	m2	3,700
Slope finish	m2	
(2) Irrigation canal		
Excavaion	m3	60
Embankment	m3	50
Concrete, B	m3	74
Wire mesh net	m2	
(3) Drainage canal		
Excavation	m3	150
(4) Canal related strucure		
Excavation	m3	50
Backfill	m3	
Concrete, B	m3	26
Formwork	m2	110
Reinforcement bars	ton	0.38
Stop log	m2	1.5
PVC dia.400	m	90
(5) Farm land levelling		
Land levelling	ha	4
(6) Concrete border		
Excavation	m3	170
Embankment	m3	40
Backfill	m3	160
Concrete, B	m3	62
Concrete, E	m3	9
Formwork	m2	390
Reinforcement bar	ton	2.0
(7) Facility yard preparation		
Stripping	m3	100
Embankment(Lat.)	m3	500
Gravel Pavement	m2	1,000

Preliminary Work Quantity Esimate (tentative) (2/2)

Items	Unit	Quantity
2. Building and Related Facility Works		
(1) Field office		
5 rooms, H=3.5 to 4,0m	m2	144
(2) Driving yard		
W/ post and roof, w/o wall	m2	150
(3) Guard house		
H=2.5 to 3.0m	m2	2.3
(4) Generator house		
H=2.5 to 3.0m	m2	6.0
(5) Bird scaring net		
H=4.0m,	m2	750
Wire mesh	m2	1,210
(6) Gate, fence and sign board		
Gate 4.0x2.5(H)	set	1
Fence H=2.5m	m	300
(7) Carwash		
Thickness t=0.2m	m2	12
(8) Electricity supply system		
Generator 5KVA	set	2
supply system	L.S.	
(9) Water supply and sewerage systems		
Water tank 3m3	set	1
Water supply system	L.S.	
Septic tank	set	1
Sewerage system	L.S.	
(10)Air conditioning and ventilating systems		
Air conditionor	nos	2
Air conditioning & ventilating system	L.S.	

7.4 List of Personnel Concerned

(1) Office of President

Mr. M. Shitu	Secretary, (Development Aid Division) Office of Planning and Budget
Mr. J. C. Chalokwu	Principal Secretary, (Development Aid Division) Office of Planning and Budget
Mr. B. A. Adewusi	Principal Secretary, (Development Aid Division) Office of Planning and Budget
Mr. H. N. O. Ezenwa	Chief Planning Officer Office of Planning and Budget
Mr. A. A. Aderinto	Senior Assistant Secretary Office of Planning and Budget

(2) Anambra-Imo River Basin Development Authority (Owerri)

Col. C. Ude	Chairman of Board of Director
Mr. W. O. Okonkwo	General Manager
Mr. E. C. Nwude	Assistant General Manager
Mr. G. K. Okoro	Assistant General Manager
Dr. F. Soribe	Assistant General Manager
Mr. H. Okoye	Area Manager
Mr. N. Mgbemena	Project Manager of LAIP
Mr. A. N. Illoh	Civil Engineer

(3) Embassy of Japan in Nigeria

Mr. M. Donowaki	Ambassador
Mr. T. Shibata	Counsellor
Mr. T. Kato	First Secretary

(4) Taisei Corporation

Mr. T. Toratani	Regional manager of West Africa
Mr. K. Matsukura	Manager of Mechanical Section
Mr. M. Yoshida	Manager for Rice Mill Plant Project

(5) Nippon Koei Co., Ltd., Lower Anambra Office

Mr. Y. Kamiya	Team Leader
Mr. S. Honma	Assistant Team Leader
Mr. K. Kyoizumi	Irrigation Engineer

7.5 List of Data Collected

(1) Meteorological Data (See ANNEX C)

Daily Rainfall at Umumbo 1984 - 1987

Daily Rainfall at Omor 1987 - 1988

(2) Contract Documents

Maintenance of Structures for Control of Agulu/Nanka Erosion Gullies

The Erection & Completion of 2 Bed Room Boys Quarters at Owerri

ANNEX A BIRD PROTECTION

A.1 Comparative Study

In order to prevent a part of the cultivation test field from damage by birds, some counter-measures are studied. Generally, the following alternatives are considerable.

(a) watcher
(b) temporary post and net
(c) fixed post and temporary net
(d) fixed post and net
(e) scarecrow, blank shot, searing tape, etc.

Out of those, the alternatives (e), which is not practical in effect and economical, and the alternative (b), in which the posts fall down easily, are eliminated in the study.

Alternatives (a), (c) and (d)

The alternative (a) is the most economical one but not perfect. The alternative (c) is more economical than that of (d) in both investment and running costs. From the above, alternative (c) is selected for a sub-plot of the cultivation test field.

A.2 Cost Comparison

(1) Alternative (a)

Construction cost	:	zero
Annual running cost	:	₦6,000

(2) Alternative (c)

Construction cost	:	₦23,000
Annual running cost	:	₦16,000

(3) Alternative (d)

Construction cost	:	₦190,000
Annual running cost	:	₦21,000

A.3 Design of Net Supporting Post

The fixed post of alternative (c) will be made of reinforced concrete to minimize maintenance work. Galvanized iron wire will be stretched between the fixed post top. The wire will be tensed by concrete anchors and turn buckles. Arrangement and structure of the post are shown in Fig. 13.

(1) Post height

In consideration of the tractor height, the post height will be 2.5 m from above the field ground level.

(2) Arrangement

The span of the shorter side direction will be 10 m for easy tractor traffic, while that of the longer side direction will be 5 m for easy netting.

(3) Wire sag

$$D = \frac{W.S^2}{8.T}$$

where, D : sag (m)
W : weight (kg/m)
S : span (m)
T : tension load (kg.f)

<u>with net</u>

$$D = \frac{0.6 \times 11.0^2}{8 \times 50} = 0.18 < 0.2 \text{ m} \qquad \text{OK}$$

<u>without net</u>

$$D = \frac{0.16 \times 11.0^2}{8 \times 50} = 0.048 < 0.05 \text{ m} \qquad \text{OK}$$

(4) Anchor weight

The weight of one anchor should be 210 kg or more.

Annex B. Hydraulic Calculation

B.1 Hydraulic Calculation

The existing canals are designed so that upstream and downstream hydraulic condition be satisfied and that earthwork volume be minimized. The newly constructed canals will distribute irrigation water up to the furthest small plot. For uniform flow, the Manning formula is utilized.

$$Q = A.V$$

$$V = \frac{1}{n} \cdot R^{2/3} \cdot I^{1/2}$$

Q : discharge (m^3/S)
V : flow velocity (m/s)
A : cross sectional flow area (m^2)
n : roughness coefficient, concrete: 0.016, earth 0.033
R : hydraulic radius (m)
I : surface gradient

Friction and other losses are calculated and the result is shown in the following table.

Hydraulic Dimensions

Canal Name and Location	Reduced Distance	Distance	Original Level	Proposed Canal Bed Level	Flow Depth	Water Surface Level	Head Loss	Discharge	Flow Velocity	Remarks
	m	m	m	m	m	m	m	l/s	m/s	
IC-1 (TC-W7-1)						(38.38)				
BP (DB-1-1)	0.00	0.00	37.90	37.90	0.20	38.10	(0.28)		1.05	
DB-1-2	58.00	58.00	37.60	37.60	0.22	37.82	0.28	105	0.92	
BP OF IC-2 (DB-1-3)	126.25	68.25	37.41	37.45	0.30	37.75	0.07	105	0.58	
EP	134.65	8.40	37.40	37.40	0.32	37.72	0.03	105	0.53	
IC-2 (DC-W7-1-2)			(37.41)	(37.45)		(37.75)				
BP	0.00	0.00	37.36	37.30	0.10	37.40	(0.35)		0.88	
BP OF IC-3 (DB-2-1)	14.50	14.50	37.16	37.21	0.10	37.31	0.11	35	0.88	
BP OF IC-4 (DB-2-2)	63.00	48.50	36.85	36.95	0.10	37.05	0.26	35	0.88	
DB-2-3 (Existing)	117.00	54.00	36.52	36.50	0.12	36.62	0.43	35	0.69	
DB-2-4	166.50	49.50	36.37	36.30	0.12	36.42	0.20	35	0.69	
DB-2-5	216.50	50.00	36.05	36.05	0.18	36.23	0.19	35	0.41	
EP	220.00	3.50	36.02	36.02	0.20	36.22	0.01	35	0.35	
IC-3						(37.31)				
BP	0.00	0.00	37.17	37.11	0.14	37.25	(0.06)		0.56	
DB-3-1	3.00	3.00	37.08	37.10	0.14	37.24	0.01	35	0.56	
DB-3-2	26.00	23.00	36.98	37.04	0.14	37.18	0.06	35	0.56	
DB-3-3	49.00	23.00	37.10	36.97	0.14	37.12	0.06	35	0.56	
EP (DB-3-4)	74.00	25.00	37.06	36.91	0.14	37.05	0.07	35	0.56	
IC-4						(37.05)				
BP	0.00	0.00	36.85	36.86	0.14	37.00	(0.05)		0.56	
DB-4-1	3.00	3.00	36.95	36.85	0.14	36.99	0.01	35	0.56	
DB-4-2	26.00	23.00	36.68	36.79	0.14	36.93	0.06	35	0.56	
DB-4-3	49.00	23.00	36.72	36.72	0.14	36.86	0.07	35	0.56	
EP (DB-4-4)	72.50	23.50	36.81	36.66	0.14	36.80	0.06	35	0.56	

B.2 Water Tank Capacity

Let basic water consumption be 200 lit/man.day,
then 200 x 5 man = 1,000 Lit/day

Elevated water tank : 2 times/day
1,000/2 = 500 lit = 0.5 m^3

Underground water storage tank : for 5 days
1,000 x 5 = 5,000 lit = 5.0 m^3

B.3 Electric Power Supply

	Item	No.	Capacity (W)
1.	Field Managing House		
(1)	FL 400W x 1	9	360
	FL 40W x 2	4	320
	IL 40W	1	40
	Fan 20W	2	40
(2)	Outlet	7	-
(3)	Air Conditioner	1	500
	Lift Pump	1	400
2.	Guard House		
	FL 40W x 1	1	40
3.	Generator House		
	FL 40W x 1	1	40
4.	Outdoor		
	Mercury Vapour Light	3	750

ANNEX C RAINFALL DATA

RAINFALL RECORD OF 1984 (UMUMBO)

Unit : mm

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1							21.5		8.6			
2						53.4	1.2	5.6				
3							46.8		80.9			
4							19.2		15.6			
5					55.2		0.5		4.2	10.3	9.9	
6				42.9				17.3				
7						29.2	7.6					
8				39.3						4.3		
9						26.6		1.4	8.6			
10					16.0							
11						44.9	14.4		15.3	39.8		
12								30.3		14.2	0.4	
13				4.2			4.0	9.1	24.0			
14					12.7	26.7	9.4					
15			3.3	1.7						15.2		
16					15.8		22.0	45.8	13.9	1.0		
17							24.3	5.0				
18				4.2	60.1	2.5	7.5	12.1		5.0		
19				27.6		35.4			1.0			
20						1.2	30.4		8.3			
21						10.7				6.4		
22			2.8			30.2			14.4	2.0		
23						24.1	7.9	12.0				
24												
25						14.2		69.5				
26					17.2		76.9	0.8	140.2			
27			44.7	2.7					6.6			
28				12.3	13.2	24.5				1.2		
29		X		2.5			41.8	10.9				
30		X		5.4	7.6			50.0	69.0			
31		X		X		X		16.8	X		X	
Total	0.0	0.0	50.8	142.8	197.8	323.6	335.4	286.6	410.6	99.4	10.3	0.0
Days	0	0	3	10	8	13	16	14	14	10	2	0

Annual Rainfall 1,857.3 mm

RAINFALL RECORD OF 1985 (UMUMBO)

Unit : mm

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1					3.6	27.0				23.2		
2				21.9			16.0		42.4			
3					1.8		5.8	46.3	0.5	25.8		
4				1.7					13.7	13.7		
5				1.1		28.4	2.6	20.7	9.6			
6							41.5	57.9	15.8			
7					1.2		1.1	40.4				
8									13.3	9.2		
9			1.6		11.4				1.9	1.8		
10				18.5			23.7		0.7			
11							21.0	1.5	1.2	29.8	3.5	
12	6.6		20.3			14.7	1.2	5.8	22.6			
13					16.0		4.4					
14						33.9	4.3	3.7	2.0	2.7		
15	7.6						4.2	16.9		8.1		
16								12.2		9.4		
17			42.8		17.8	24.9	85.1		1.6			
18						5.6	9.6	28.0	1.5			
19				69.3	12.9	15.9	2.7		1.3	5.5		
20					13.2		1.8	11.4	5.4			
21			7.7		16.9	0.2	19.0	0.5	0.8		2.5	
22					41.4			9.8				
23								2.5				
24					12.5							
25			3.2	11.6		1.4		5.0	4.0			
26					11.4	6.6			15.6			
27			90.9					2.3	4.5			
28					1.4			1.2				
29		X						4.7				
30		X				29.0	8.8	34.9		4.6		
31		X	14.7	X		X		3.9	X		X	
Total	14.2	0.0	181.2	124.1	161.5	187.6	252.8	309.6	158.4	133.8	6.0	0.0
Days	2	0	7	6	9	11	17	20	19	11	2	0

Annual Rainfall 1,529.2 mm

RAINFALL RECORD OF 1986 (UMUMBO)

Unit : mm

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1						5.7	0.8		9.5	40.6		
2				11.2	13.1							
3							1.0	16.2	8.0			
4							11.5	15.9	4.7	38.6	40.4	
5						36.6		8.8	64.5	31.8	39.8	
6							2.5	7.3				
7			0.7			19.0						
8							6.4		11.4			
9				5.7	16.0	35.0			79.6			
10				32.8	18.0	33.0	37.2					
11			5.3		25.7				11.1			
12							24.8	2.5	13.1			
13	3.4					31.8			60.7			
14						7.6	10.0		9.0			
15				1.4			40.4					
16								3.0		23.9		
17						1.6				15.9		
18					31.0				10.3	3.2		
19						3.2		3.2				
20			10.1		15.9	31.8	15.0					
21									4.0			
22					18.1		82.8			39.8		
23			25.7						2.2			
24			7.3						11.2			
25				5.0				17.5		8.0		
26			9.1							31.8		
27					10.7		21.5	5.6	6.4			
28				29.0						31.2		
29		X							22.3			
30		X						21.2				
31		X	15.7	X		X		42.4	X		X	
Total	3.4	0.0	73.9	85.1	148.5	205.3	253.9	143.6	328.0	264.8	80.2	0.0
Days	1	0	7	6	8	10	12	11	16	10	2	0

Annual Rainfall 1,586.7 mm

RAINFALL RECORD OF 1987 (UMUMBO)

Unit : mm

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1						3.2				39.8		
2		0.3					24.0	41.0		11.8		
3					1.6		32.0			12.1		
4				1.6					22.3			
5							40.0		47.7	41.4		
6									15.9	47.7		
7												
8									23.8			
9								73.2		47.7		
10							64.0	63.7				
11									15.9	31.8		
12												
13												
14							24.0	15.9				
15						2.3			12.7			
16						1.6				16.7		
17					5.6							
18					1.6			23.9				
19												
20									15.9			
21	1.2		5.6			3.2						
22												
23						2.4	24.0					
24												
25					2.7	4.0		25.5				
26		4.0	1.6				16.0					
27						1.6						
28					7.2	4.0						
29		X					38.0					
30		X						66.8				
31		X		X		X		25.5	X		X	
Total	1.2	4.3	7.2	1.6	18.7	22.3	262.0	335.5	154.2	249.0	0.0	0.0
Days	1	2	2	1	5	8	8	8	7	8	0	0

Annual Rainfall 1,056.0 mm

RAINFALL RECORD OF 1987 (OMOR)

Unit : mm

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1								1.0	14.2	43.5		
2								2.0		19.5		
3								11.5				
4							20.0	1.0	11.0	15.0		
5							39.3		27.0	29.0		
6							13.8	1.0	16.0	16.5		
7								2.0	22.5	10.0		
8							1.3	92.0	12.0	1.5		
9									0.5			
10								9.5				
11							34.0	12.0				
12							15.5					
13							2.0	0.3				
14								5.0	18.0			
15							13.0	1.0	2.0			
16							0.5	2.0		7.0		
17							5.0					
18							0.5	42.5				
19							2.0	11.0				
20												
21								0.5	18.0			
22								3.5	6.5			
23								0.3		0.5		
24							25.0	15.0		17.5		
25								6.5				
26								18.5				
27								6.5				
28								0.5	0.5			
29		X					12.5	4.5				
30		X					21.3	68.0				
31		X		X		X		40.0	X		X	
Total	-	-	-	-	-	-	205.7	357.6	148.2	160.0	0.0	0.0
Days	-	-	-	-	-	-	15	26	12	10	0	0

RAINFALL RECORD OF 1988 (OMOR)

Unit : mm

DAY	JAN.	FEB.	MAR.	APR.	MAY	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.
1						2.0						
2				1.5	13.2							
3			1.5									
4			4.0									
5				1.2	50.0							
6						2.0						
7				0.2								
8			2.0		1.4	12.0						
9												
10												
11												
12												
13						61.5						
14						1.0						
15												
16						31.0						
17						1.0						
18				4.9	15.6							
19				3.3								
20				1.0		15.0						
21				1.0	7.0							
22				26.9								
23					6.5							
24				1.0		9.0						
25	4.9			0.5	2.5							
26					3.8	25.4						
27				2.5	50.2							
28					9.0							
29		X										
30		X		5.0								
31		X		X	16.6	X						
Total	4.9	0.0	7.5	49.0	175.8	159.9						
Days	1	0	3	12	11	10						

ANNEX D BEARING CAPACITY

DEPTH (cm)	BEARING CAPACITY (t/m2)					
	A	B	C	D	E	F
5	-	-	2.38	-	4.08	-
10	1.36	3.40	6.81	6.13	4.42	4.63
15	2.31	4.08	8.85	5.92	5.10	4.08
20	5.85	5.79	11.57	7.90	9.19	6.94
25	8.84	8.16	12.93	6.81	10.89	12.93
30	9.66	8.71	12.25	7.83	12.59	13.61
35	9.26	10.55	11.57	9.66	14.29	13.61
40	8.98	8.84	-	10.89	-	-
45	-	8.64	-	12.93	-	-
50	-	9.60	-	13.61	-	-
55	-	10.89	-	-	-	-

Note: 1. This survey was made by corn penetrometer in ponding condition on November 19, 1988.

2. Measurement point
   X: distance from farm road NW-106
   Y: distance from southern levee of proposed facility yard plot

Point	A	B	C	D	E	F
X (m)	20	50	50	80	80	80
Y (m)	15	15	30	15	30	45

JICA