

ナイジェリア
ローア・アナンブラ
農業開発（かんがい稲作）計画
実施協議調査団・長期調査員
報告書—資料編

平成元年 1 月

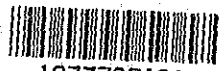
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1. L A I P 組 織

Chapter 2 ORGANIZATION AND STAFFING

2.1 General

With the completion of all the construction works of the project facilities, the project office and zonal office shall be reinforced for O/M of the project.

The detail of the provision of the organization and staffing for the whole project office, zonal office, the institutional supporting service has already been studied and proposed in the previous report "PROPOSAL ON INSTITUTIONAL ORGANIZATION FOR OPERATION AND MAINTENANCE OF THE PROJECT" prepared by the consultant in May, 1986.

So, in this chapter, hereinunder mentioned the organization and staffing of the O/M section which is a section of the engineering division ^{and zonal office concerning} the O/M service of irrigation and drainage facilities. The proposed organization structure is illustrated in the Fig 2.1 and proposed staff requirement is estimated in the Table 2.1.

In addition to the above establishment, organization of the water users association is also proposed taking into account the rotation irrigation system to be applied to the on-farm operation programme, responsibilities of the participant farmers on the O/M of the on-farm facilities. The detail of function is mentioned in chapter-6 of this manual.

2.2 Operation and Maintenance Section

The O/M section is one of the execution unit and shall be responsible for all activities for O/M of the irrigation and drainage facilities. The O/M section consists of two working units i.e. operation sub-section and maintenance sub-section. The duty and function of O/M section is as follows.

- 1) Preparation of seasonal and annual irrigation plan, including recommendation to the Agricultural Division for modification of the cropping schedule.

- 2) Preparation of the repair/maintenance plan on irrigation and drainage facilities and execution of the work.
- 3) Preparation of the estimate of the annual budget for O/M works and control the expense for them.
- 4) Management and control of the actual water distribution from pumping station to the turn out on main canal.
- 5) Supervision and technical guidance to the Zonal Office Staff and water User's Association about on-farm O/M works.
- 6) Management of the meteorological station established in the project office yard.
- 7) Monitoring and data collection through practical operation and analysis for improvement of the operation.
- 8) Up-Keeping and management of the data and the materials for O/M works and accessories of the facilities.
- 9) Compilation of seasonal and annual report, and preparation of relevant documents.

2.3 Zonal Office

The zonal office is practically the branch office of the project office and is engaged in implementation and management of the rice plantation programme and its related and/or supporting works at the on-farm level.

The zonal office is to be established in each irrigation zone i.e. Northeast zone, Northwest zone, Southeast zone and Southwest zone. Each zonal office shall have 4 main functions which are storing service, agricultural extension service, machinery service and O/M service.

The duty and function of zonal office concerning the O/M service ^{is} as follows:

- 1) Preparation of cropping schedule by each crop season in conjunction with the project office
- 2) Management and control of the actual water distribution from turnout on main canal to the head of Rotational Irrigation Block.
- 3) Supervision and technical guidance to the water user's association concerning on-farm O/M activities including settling the dispute arising among the farmers.
- 4) Collecting the field data and compiling the monthly activities report.

2.4 Relevant Sections

2.4.1 Pumping Station

Pumping station is one of the essential working sections for implementing irrigation operation. All the pumping and electrical equipments shall be operated and maintained by the staff of the pumping station in the proper manner according to the O/M manual on pumping and electrical equipment and other manufacture's manuals.

The annual operation schedule and daily operation programme shall be informed by the O/M section and the periodical maintenance shall be scheduled and performed keeping close contact with O/ M section without any disturbance on the irrigation schedule. The duty and function of pumping station is summarized as follows.

- 1) Operation and maintenance of the pumping and electrical equipment and related facilities
- 2) Recording and filing of the operation and maintenance records

- 3) Recording and submitting of the records for the Anambra river run-off and pumped water discharge.
- 4) Preparation of the monthly performance report

2.4.2 Motor Pool and repairing section I in mechanical service section

The heavy equipment for O/M works shall be mobilized by the motor pool, and maintained by repairing section I in mechanical service section keeping close contact with O/M section.

The schedule for maintenance works for the facilities including the location, work volume and work method shall be informed by the O/M section. The duty and function of the motor pool and repairing section I are summarized as follows.

- i) Motor Pool
Mobilization of O/M equipments and vehicles according to the repair and maintenance schedule on irrigation and drainage facilities.
- ii) Repairing Section I
repairing and maintenance of O/M equipment according to the manufacturer's manual.

2.5 Job-description and Quolification

The adequate O/M service for irrigation and drainage facilities require the following personnel:

O/M Section

- Chief of O/M Section
- Chief of Operation
- Water Master
- Chief of Maintenance
- Work Inspector

Zonal Office

- Zonal Leader
- Ditch Tender

The job-description and qualification for each of the above personnel are shown as follows.

(1) Chief of O/M Section

a) Job-description

- preparation of seasonal and annual O/M plan
- preparation of pump operation schedule and
- formulation of long range plan of O/M
- preparation of the estimate of annual budget and water charge and control the expenses of the O/M section
- preparation of the technical specification and tender document of the maintenance works to be undertaken by contractor.
- control and supervise all the aspects related to the O/M works
- organizing of the staff meeting with the Chief of operation, Chief of maintenance, Chief of pumping station and zonal leaders
- preparation of the annual report
- analysis of the collected data and study for improvement of the project

b) Qualification

Senior Irrigation Engineer (Grade 10) with more than seven years experience in the practical work on the field shall be required. He shall have a technical understanding of soil-water-plant relationships as well as engineering matters. The ability to direct and coordinate people is also required.

(2) Chief of operation

a) Job-description

- responsible for the actual water distribution on the field (including the information to pumping station concerning to the adjustment of daily pump operation hour according to the information of field irrigation conditions)
- supervise the water master and zonal office staff with respect to the operation of the irrigation and drainage facilities.
- up-keeping and management of the map, data, the materials for operation and accessory of the facilities (ie gate handle, steering, security chain, key etc)
- management of the meteorological station

b) Qualification

Irrigation Engineer (Grade 08) with enough experience as well as the basic engineering knowledge of the irrigation and drainage work shall be required. He shall be graduated at more than College of Technology.

(3) Water master

a) Job-description

- actual gate control of the Bifurcation, Cross-regulator, Turnout on main canal (including daily patrol and adjustment)
- inspection of the condition of the facilities
- preparation of the daily record
- supervision of the ditch tender and farmers
- ensuring of the facilities' condition before commencement of the irrigation
- transmitting of the field information concerning irrigation condition to the chief of operation.

b) Qualification (OND=College of Technology)

Technical superintendent (Grade 07) with enough experience on the field shall be required. Preferably, he shall be graduated at College of Technology.

4) Chief of maintenance

a) Job-description

- planning and design of repair/maintenance work in collaboration with the chief of operation
- estimation of the work volume and work cost
- control of the all maintenance activities executed by machinery, labour and farmer
- up-keeping the bench mark, station peg and other datum points

b) Qualification

Civil Engineer (Grade 08) with enough experience as well as the basic civil engineering knowledge shall be required. He shall be graduated at technical course of university.

5) Work inspector

a) Job-description

- periodical and emergency inspection of the irrigation and drainage facilities including road net work
- supervision of the maintenance work executed by machinery, labour and farmer
- transmitting of the field information concerning the maintenance work
- measurement of the work accomplished

b) Qualification

Technical superintendent (Grade 07) with enough experience on field shall be required. Preferably, he shall be graduated at College of Technology

6) Zonal leader

a) Job-description (Concerning O/M)

- general management of the zonal office upon direction of project office
- planning the irrigation schedule in each irrigation area
- responsible for the water control from turnout on main canal to the Rotational Irrigation Block
- supervision of the ditch tender and water user's association concerning the O/M activities in conjunction with the O/M section
- settling the dispute arising among the farmers
- preparation of the monthly activities report

b) Qualification

Senior Irrigation Agronomist (Grade 10) with more than five years experience in the practical work on the field shall be required.

7) Ditch tender

a) Job-description (concerning O/M)

- control the water flow from Turnout on main canal to the Rotational Irrigation Block
- Supervision of the water management within the Rotational Irrigation Block operated by the water user's association including the control of farm ridge cutting off or closing.

- inspection and supervision of the minor repair/maintenance work (including canal cleaning, weeding, desilting and reshaping of the minor irrigation canal and field drain) executed by the water user's association
- transmitting the field information to the zonal leader
- data collection of the daily performance of the irrigation

b) Qualification

Preferably, ditch tender shall be graduated from secondary school.

7.2 Auxiliary Staff and Casual Worker

In addition to the above mentioned staff personnel, the following auxiliary staff and daily-paid casual worker shall be employed in due time in order to perform proper O/M work.

Auxiliary staff

- Meteorological observer
- surveyor
- store-keeper
- Artisan (carpenter, brick layer, iron bonder etc)

Casual worker

- Night Security Guard
- unskilled labour

Man power required for labour work is mentioned in chapter 5 of this manual.

3.1 General

The main objective of operation service of the project office and zonal office is the timely delivery of irrigation water necessary to satisfy crop water requirements. The accomplishment of this objective implies the following activities.

- Planning the operation (preparation of so-called irrigation plan)
- Implementation of the plan (actual water distribution)
- Monitoring of the operation (collection of data related to water use and preparation of the corresponding reports)

3.2 Principle of Operational Irrigation System

The irrigation system shall be planned and operated on the following principles.

- 1) The irrigation system including pump operation shall be planned on "scheduled demand basis" and operated with the daily adjustment according to the feed-back information
- 2) The rotational irrigation method shall be applied in the Rotational Irrigation Block (hereinafter called R.I.B.)
- 3) Water shall be delivered on 24 hours continuous flow basis from Bifurcation to the head of R.I.B. within the irrigation period.
- 4) The pump shall be operated in one to three shift operation with proper interval taking into consideration of the pending capacity of Head Race Canal at the Bifurcation
- 5) The irrigation facilities shall be managed as follows

from pumping station	O/M section of
to Turnout on main canals	project office
Turnout on main canals	Zonal office
to the head of R.I.B.	
R.I.B.	Water User's
	association
	(under the super-
	vision of the
	O/M section and
	zonal office)

3.3 Irrigation Planning

The preparation of well-planned irrigation schedule is essential for the economical pump operation and use of water available under the project. The success of irrigation operation depends more upon efficient water control that would be achieved based on accurate irrigation planning.

The procedure of irrigation planning is summarized below

- i) fix the cropping schedule and cropping area
- ii) estimate the net water requirement by each growing stage
- iii) estimate the expected effective rainfall
- iv) estimate the diversion water requirement of pumping station
- v) prepare the pump operation schedule
- vi) prepare the fuel and oil supply schedule for the pumping equipment.

3.3.1 Proposed Cropping Pattern

In preparing the schedule for irrigation operation, cropping pattern shall be fixed to serve as the basic.

The proposed variety and cropping pattern which consists of complete double crops of paddy is determined on the basis of the results of the variety test performed by the Consultant during the farm guidance period.

The proposed cropping pattern is shown in Fig 3.1 and summarized below.

<u>Work item</u>	<u>Rainy Season</u> (130-135 days variety)	<u>Dry Season</u> (120 days variety)
Seeding (Nursery preparation)	beg. of June to Mid July	beg. of November to end of December
Transplanting	Mid of June to end of July	Mid of November to mid of January
Harvesting	Mid. of October to mid of December	beg. of March to end of April

The detailed schedule will be determined by the planning/executing committee of L.A.I.P. every year.

3.3.2 Irrigation Schedule

Irrigation schedule can be divided into the following stage

1) Nursery bed

The nursery plots are to be demarcated in each turnout area respectively. The total area of nursery plots is approximately 1/20 of the planting area. The transplanting is to be carried out after the seeding grows up for 21 days in the nursery bed. The nursery plots will be cropped after up-rooting.

2) Land preparation

After slashing, plowing and harrowing work, the puddling work is to be carried out under the flooded condition by using tractor with equipment 2 to 3 days before the transplanting work. The quantity of water requirement for puddling works can be assessed by the depth of soil layer to be saturated, the soil character, a soil moisture carried over, ponding water depth, evaporation and percolation depth etc. However, the figures varies from field to field and from time to time. The average water depth required for puddling works is estimated at 130 - 150 mm in net.

3) Irrigation in main field

The irrigation in main field is to provide adequate water to meet the water consumption in the field. It is scheduled to start after rooting and fertilization 3 to 7 days from transplanting and is to last until 15 days before harvesting. The water depth to be applied in each growing stage is shown in Fig. 6.1 in chapter - 6 of this manual and summarized below

<u>Rice growing stage</u>	<u>Water depth</u>	<u>Applicable duration</u>
Rooting to active tillering stage	50 mm	after 3 to 7 days from transplanting up to 30 days from transplanting
Maximum tillering stage to dough ripe stage	100 mm	after 30 days from transplanting up to just start of the yellow ripening
Yellow ripe stage to harvesting		stop irrigation and drain out the stagnant water from the plot

Table - 2.1

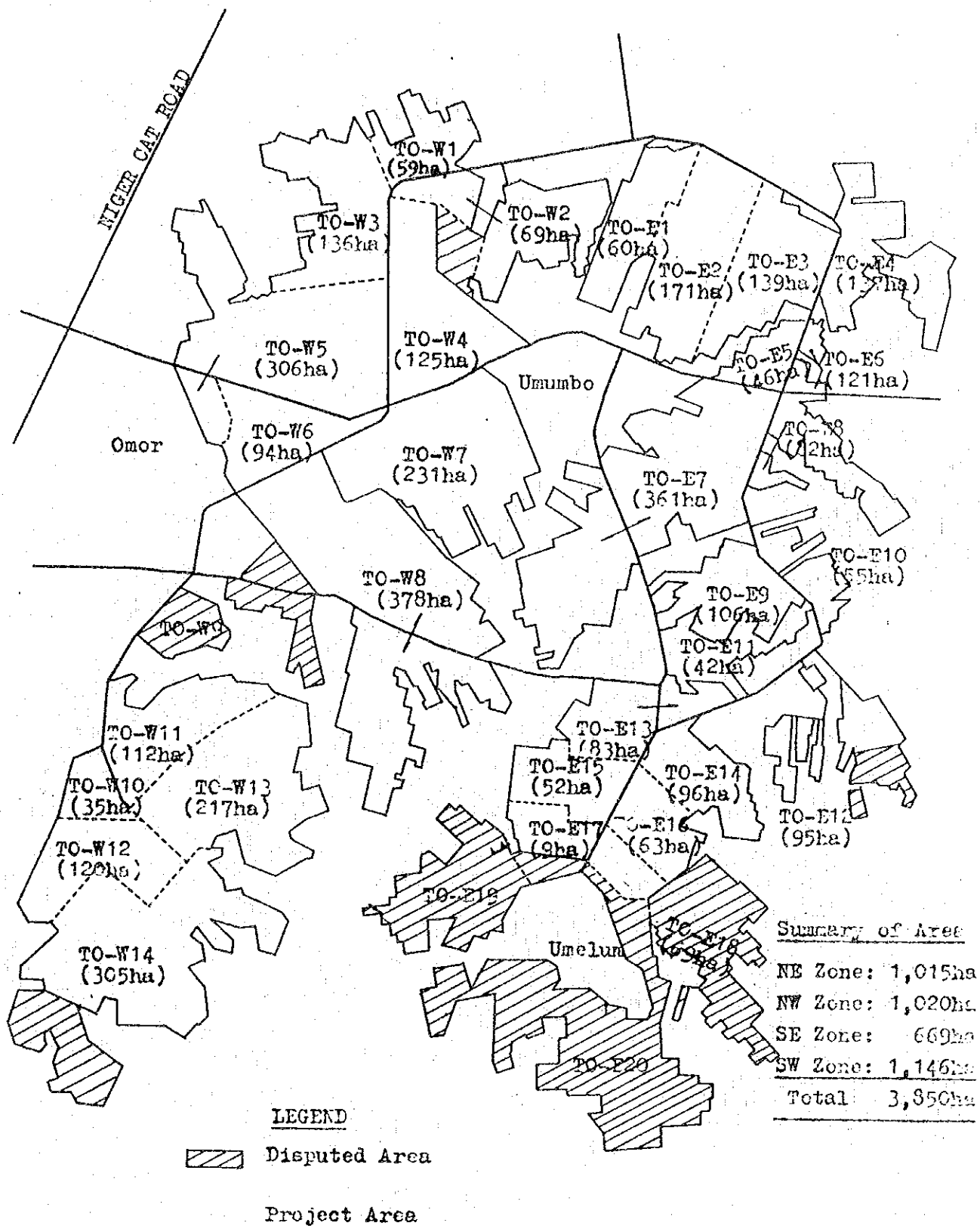
Proposed Staff Requirement

(1) O/M Section and Zonal Office						
	O/M Section	Zonal Office				Total
		NE	SE	NW	SW	
Chief of O/M Section	1		✓			1
Chief of Operation	1					1
Water Master	4					4
Meteo. Observer	1		(2)			1
Chief of Maintenance	1		1			1
Work Inspector	4		✓			4
Surveyor	1					1
Artisan	as required					
Zonal Leader		1	1	1	1	(4) ✓
Assistant		1	1	1	1	(4) ✓
Ditch Tender		15	13	15	10	53
Total	13	17	15	17	12	74

(2) Motor Pool and Repairing Section I			
	Motor Pool	Repairing Section I	Total
Mechanical Engineer	1	1 ✓	2
Higher Tech. Officer	1	1	2
Operator	15 (11) ✓		15
Mechanic		1	1
Mate	5	2	7 ✓
Total	22	5	27

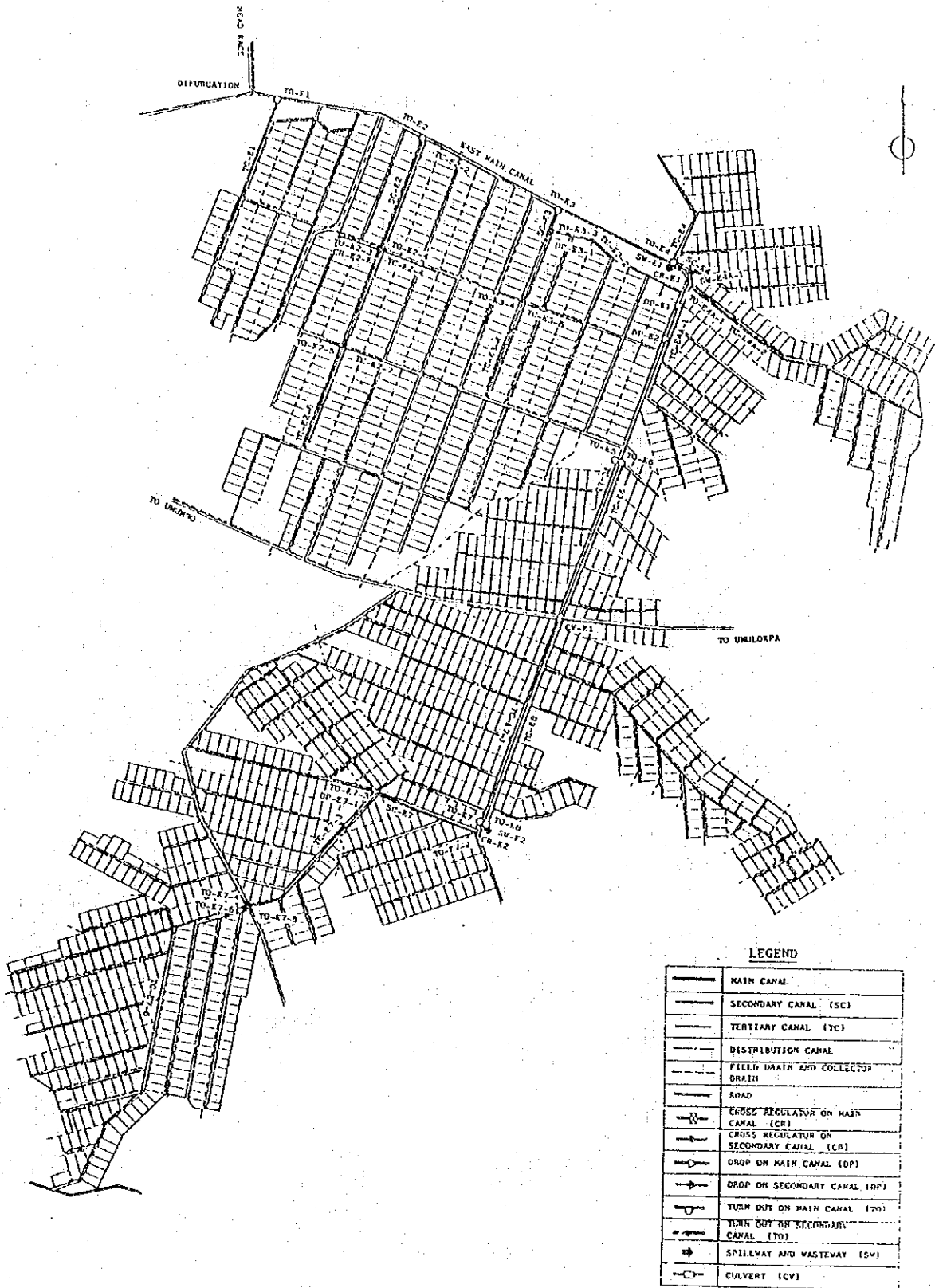
2. 圃場詳細図面

Fig. 8 IRRIGATION AREA



GENERAL LAYOUT

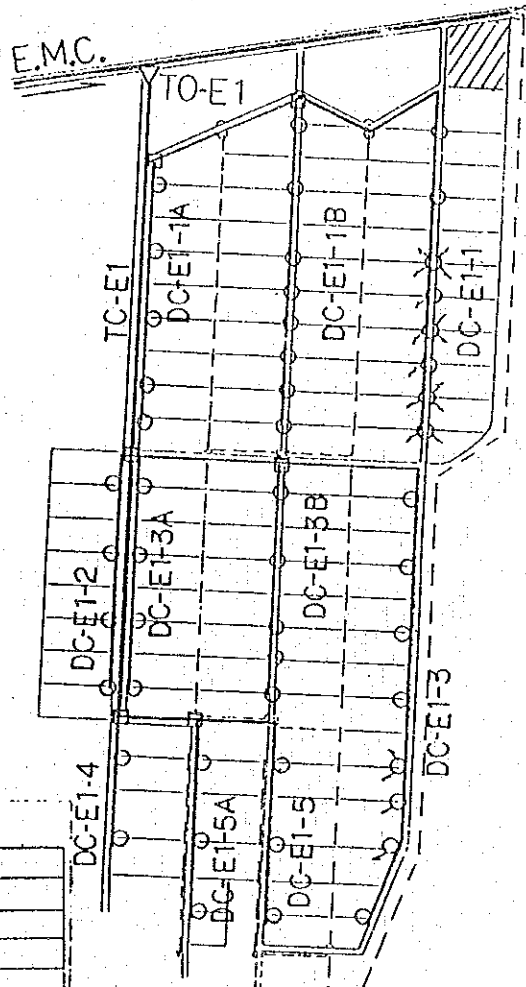
NE-ZONE



LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL
	FIELD MAIN AND COLLECTOR DRAIN
	ROAD
	CROSS REGULATOR ON MAIN CANAL (CR)
	CROSS REGULATOR ON SECONDARY CANAL (CSR)
	DROP ON MAIN CANAL (DP)
	DROP ON SECONDARY CANAL (DSP)
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TOS)
	SPILLWAY AND WASTEWAY (SW)
	CULVERT (CV)

0 500 1000m
SCALE



LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE

LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CO TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

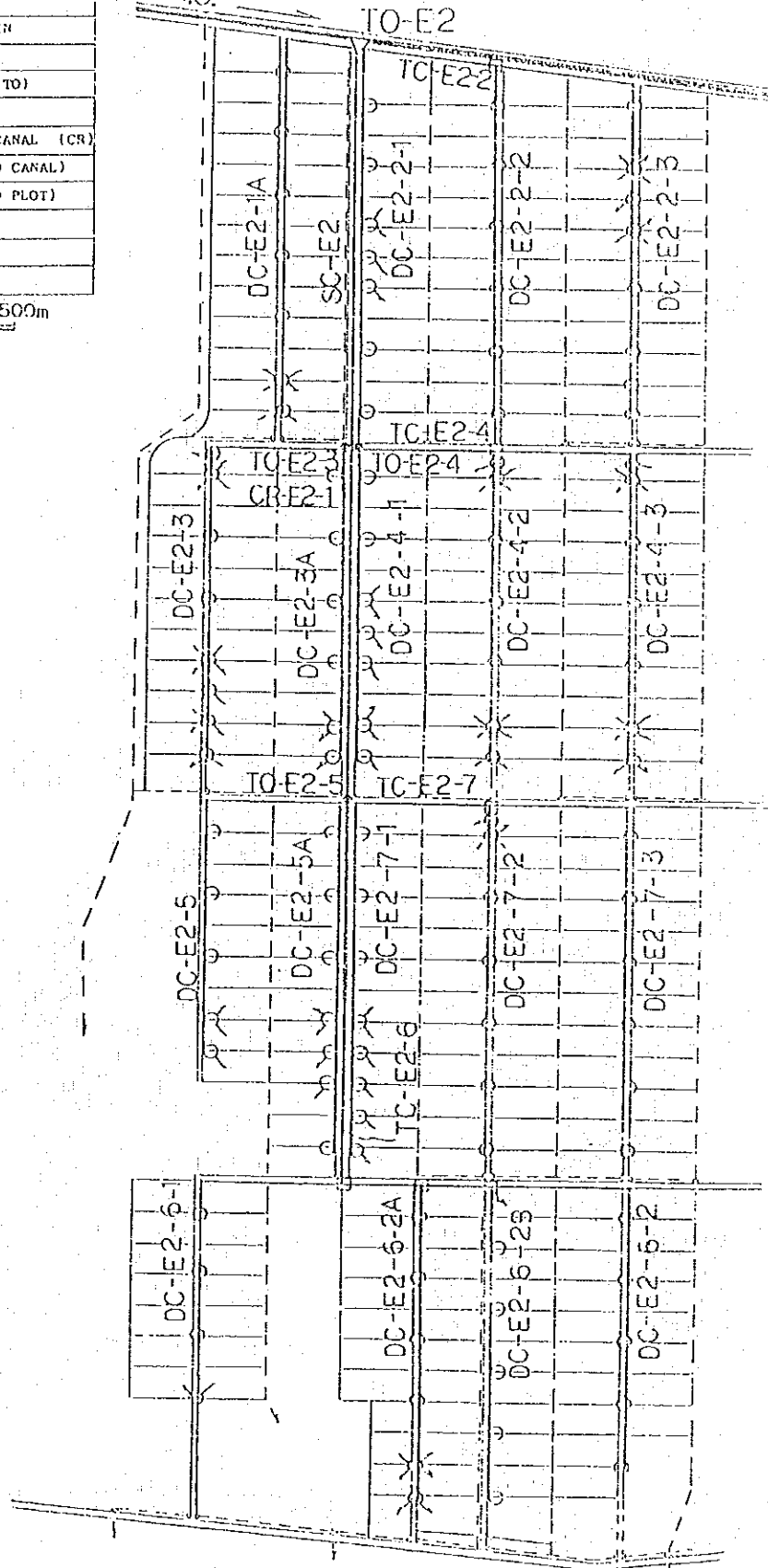
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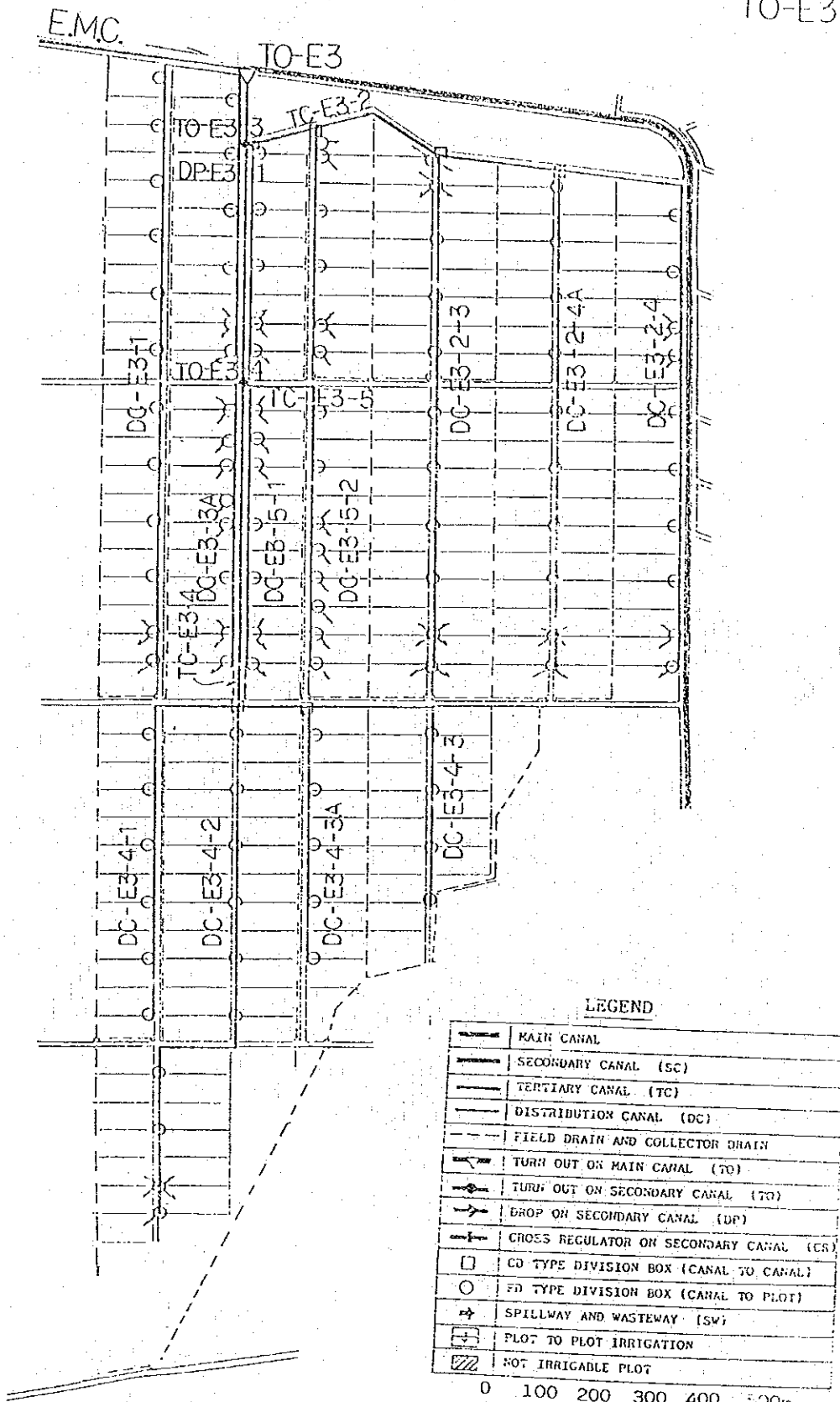
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TO-E2

E.M.C.

TO-E2





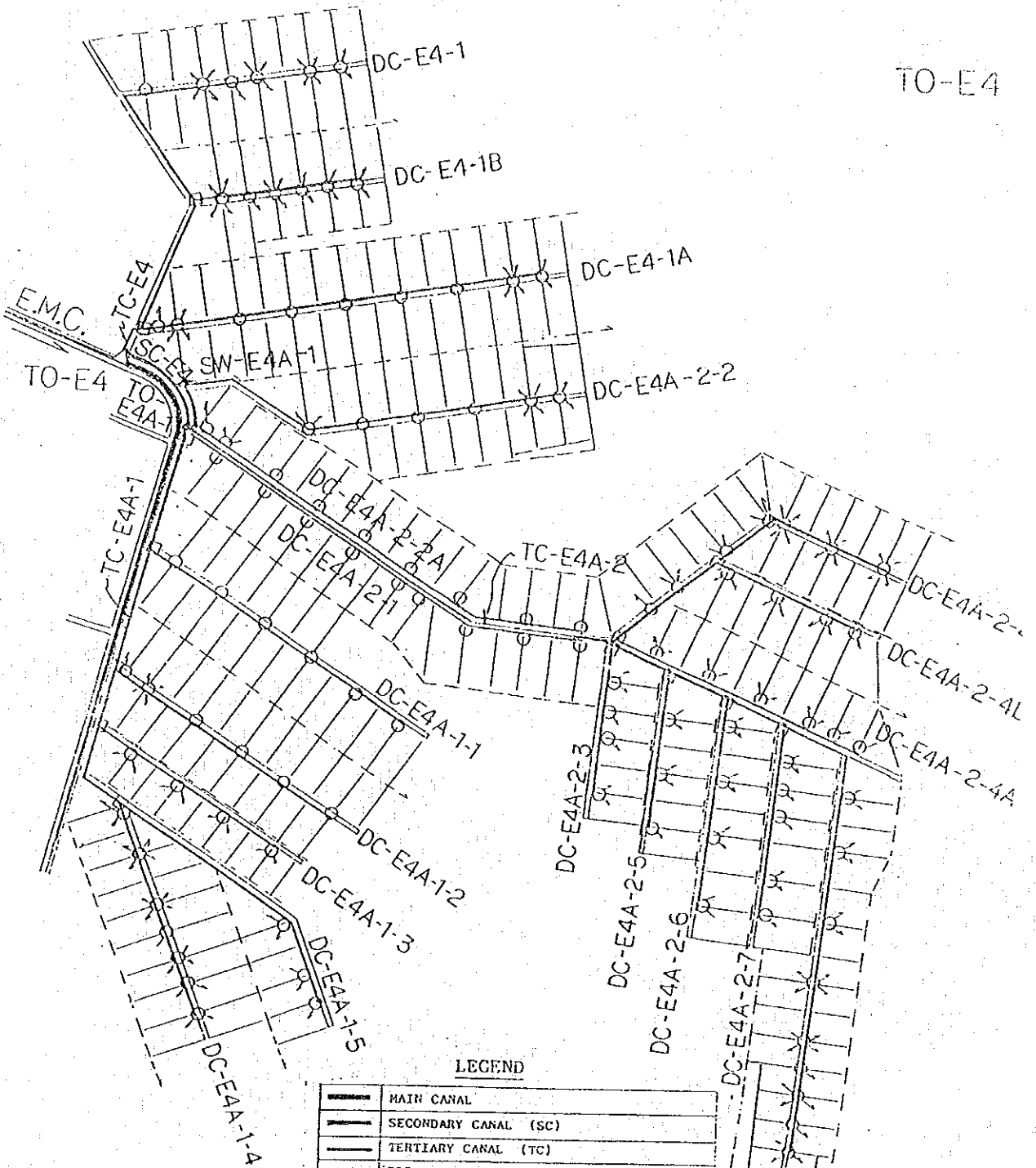
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	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500ft

SCALE

TO-E4



LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
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	DROP ON SECONDARY CANAL (DP)
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	FD TYPE DIVISION BOX (CANAL TO PLOT)
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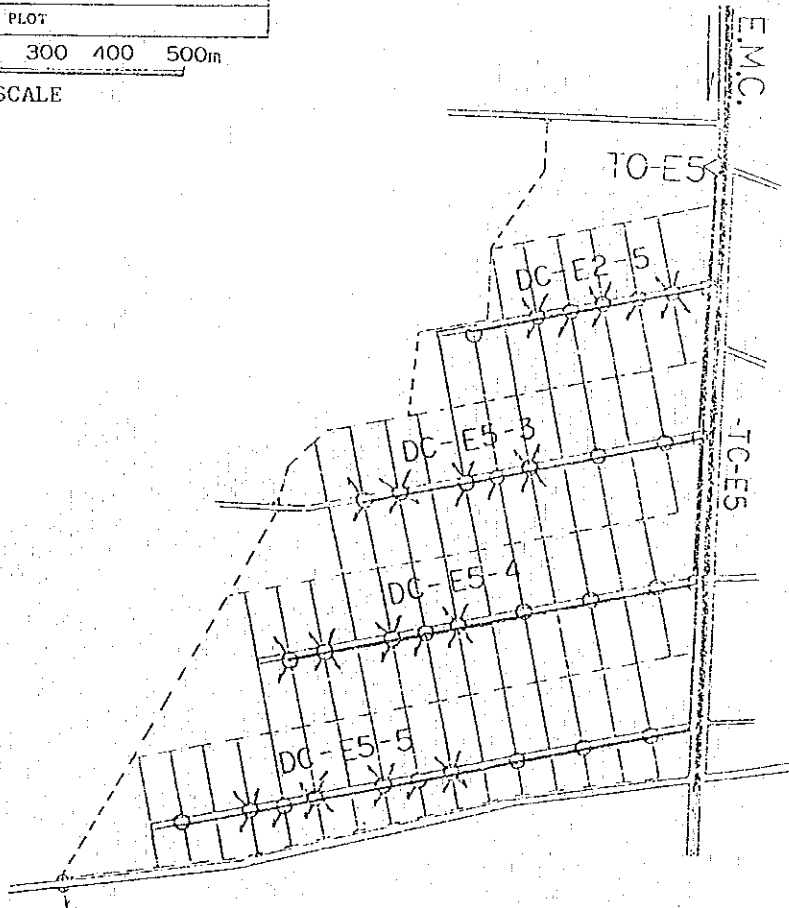
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	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
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SCALE

TO-E5

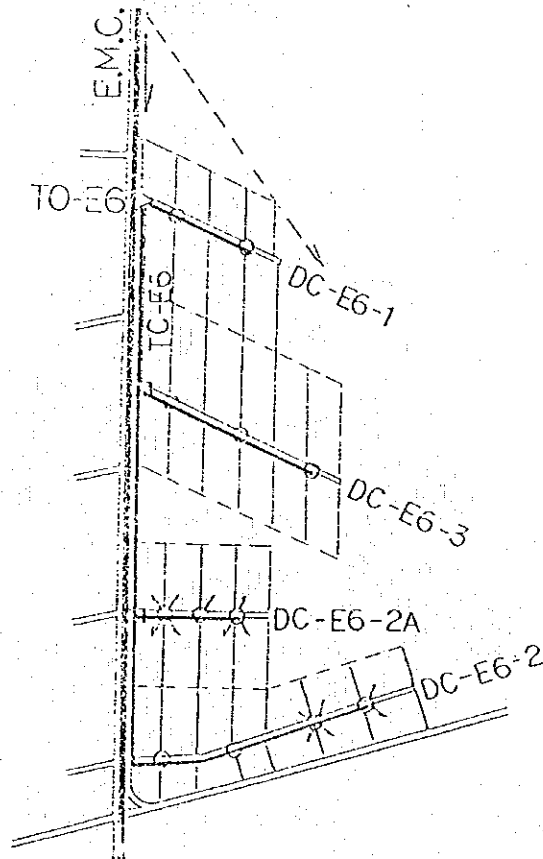


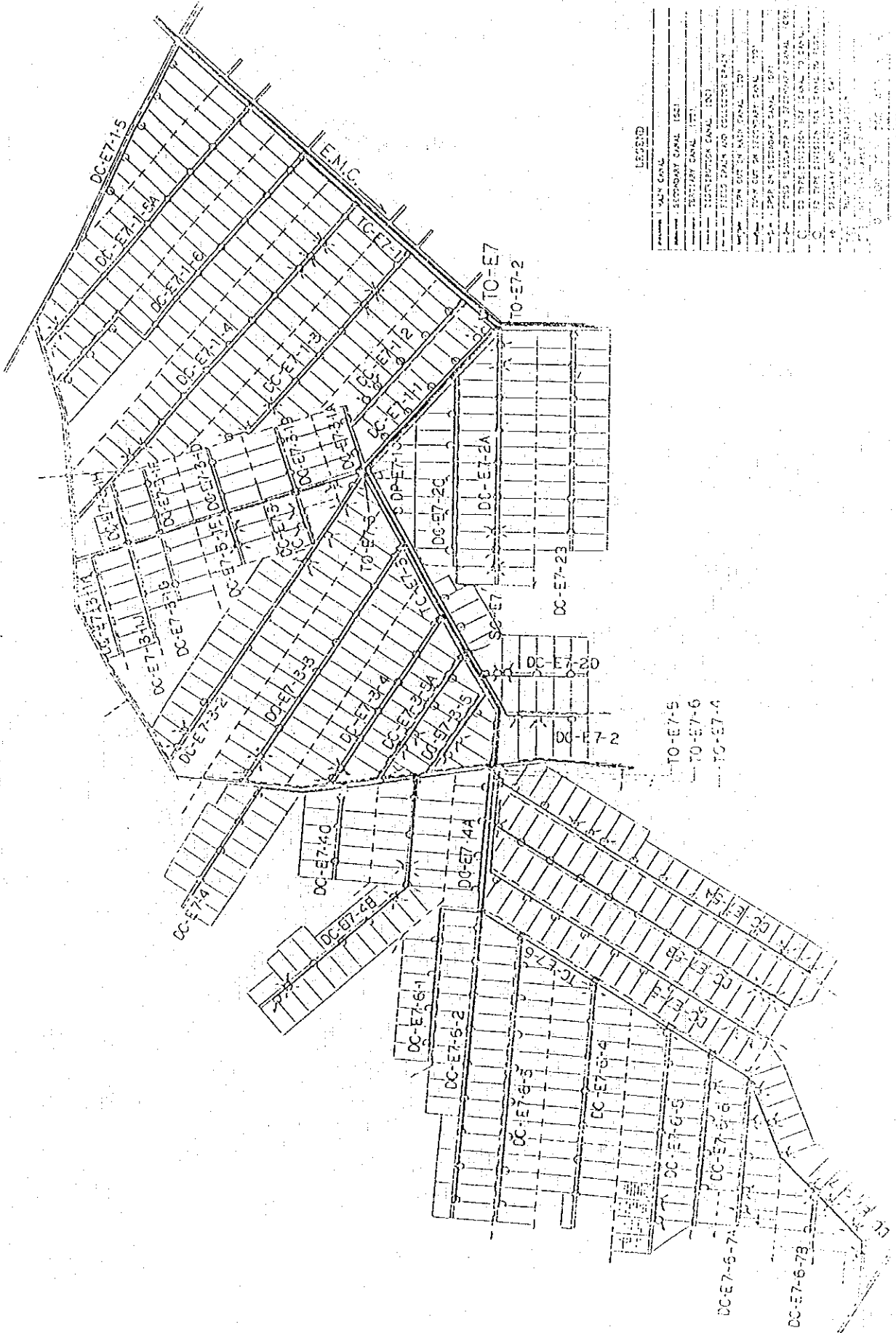
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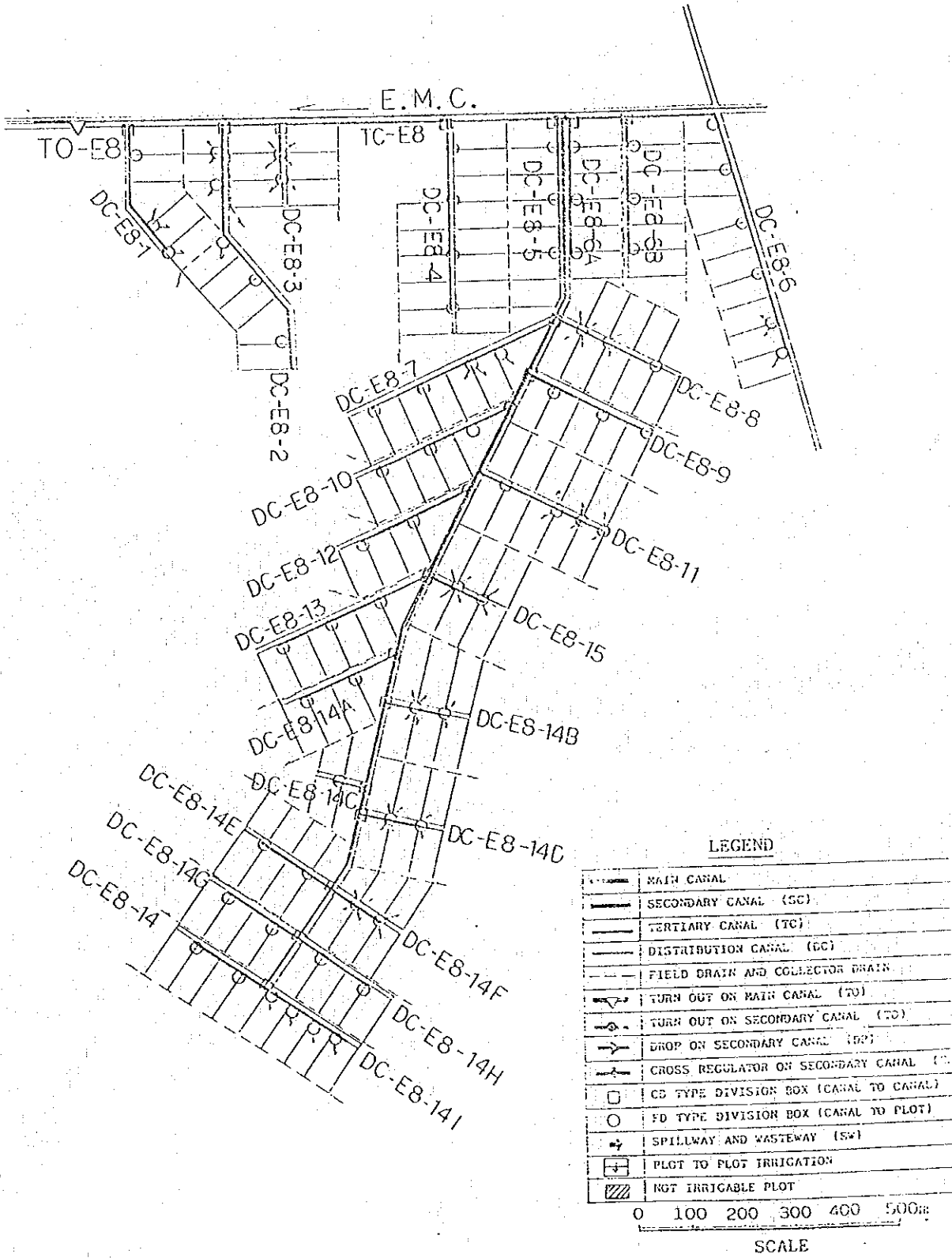
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	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
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	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m
SCALE

TO-E6

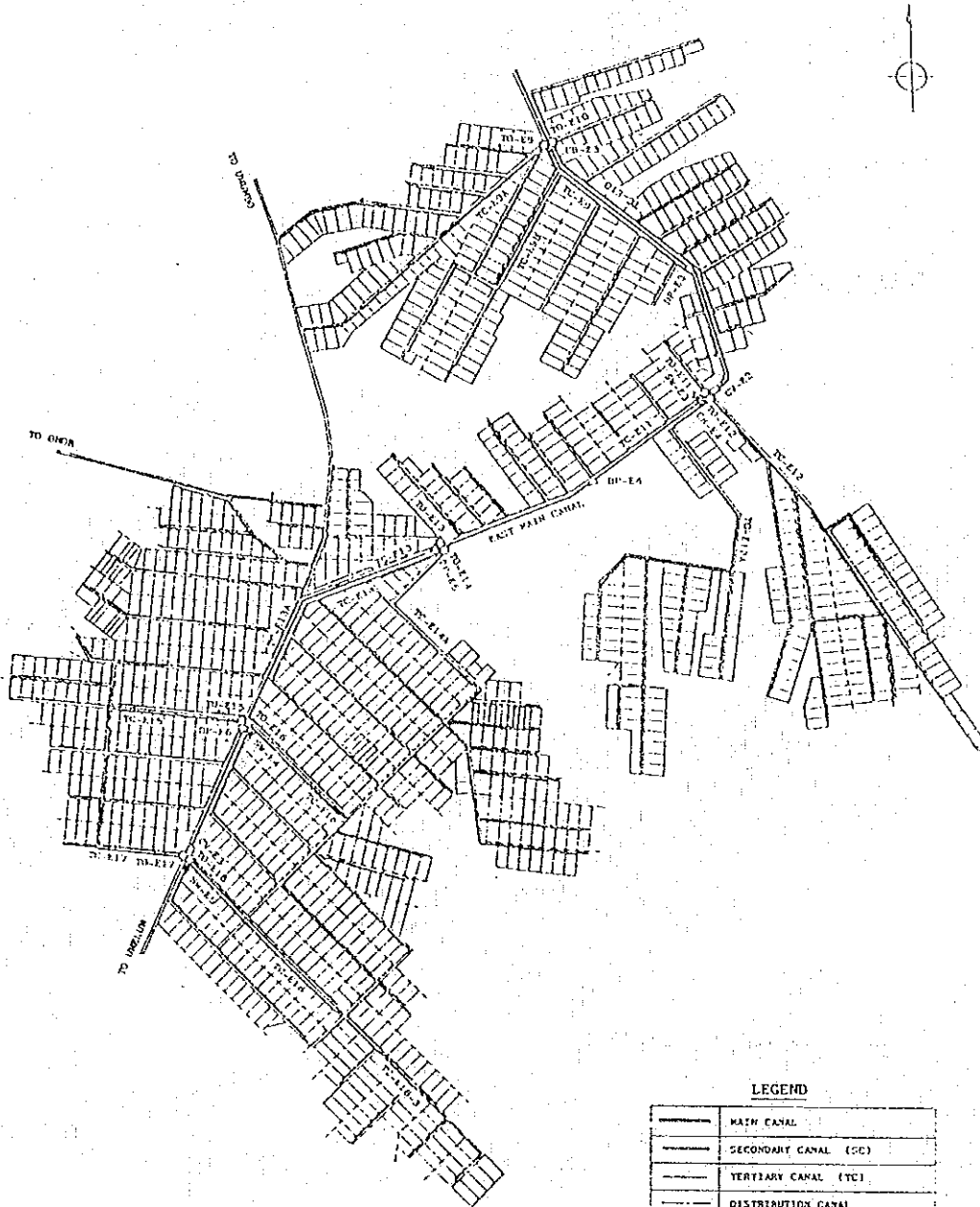






GENERAL LAYOUT

SE-ZONE

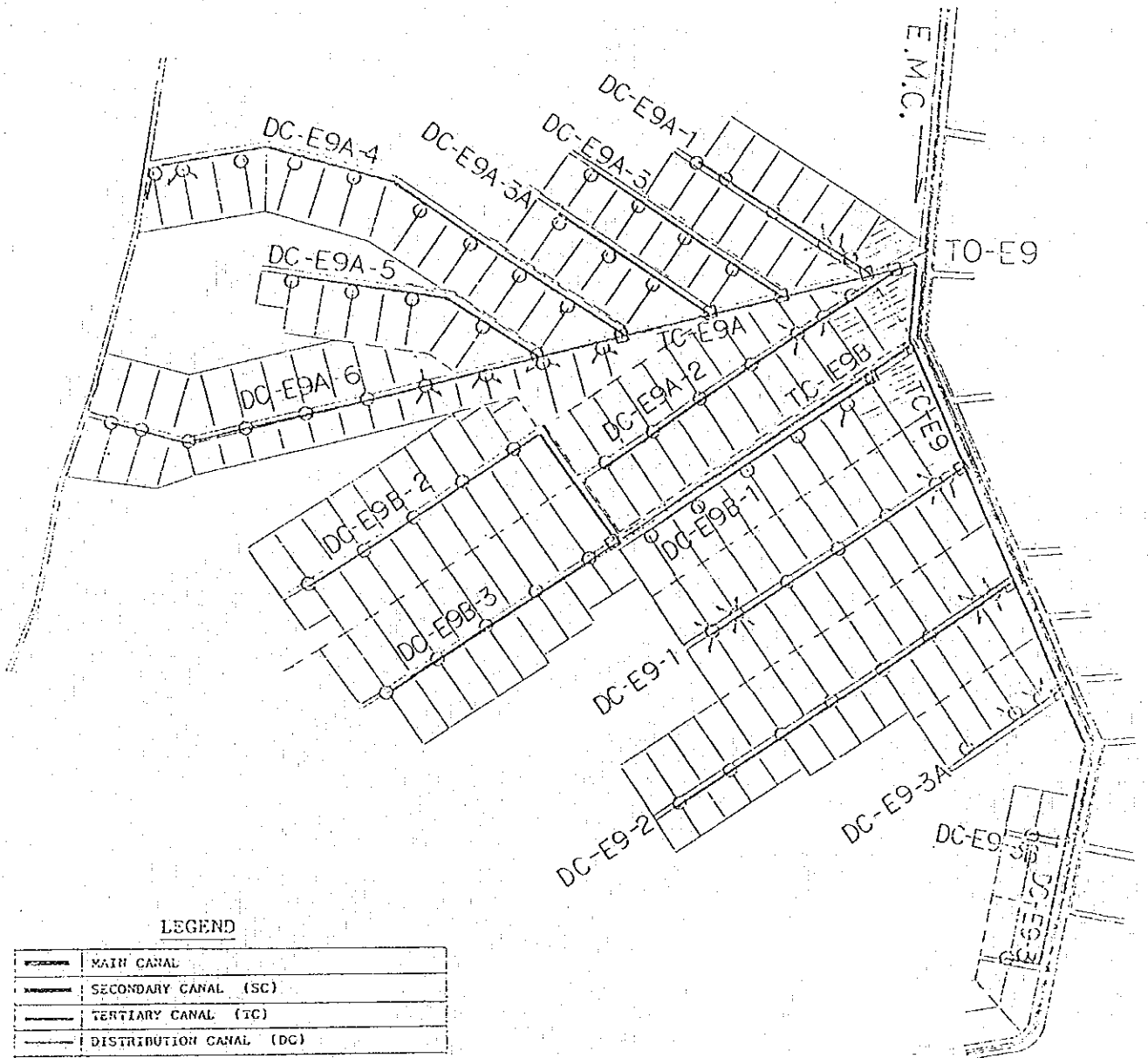


LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
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	ROAD
	CROSS REGULATOR ON MAIN CANAL (CR)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	DROP ON MAIN CANAL (DP)
	DROP ON SECONDARY CANAL (DP)
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	SPILLWAY AND WASTEWAY (SV)
	CULVERT (CV)

0 500 1000m
SCALE

TO-E9

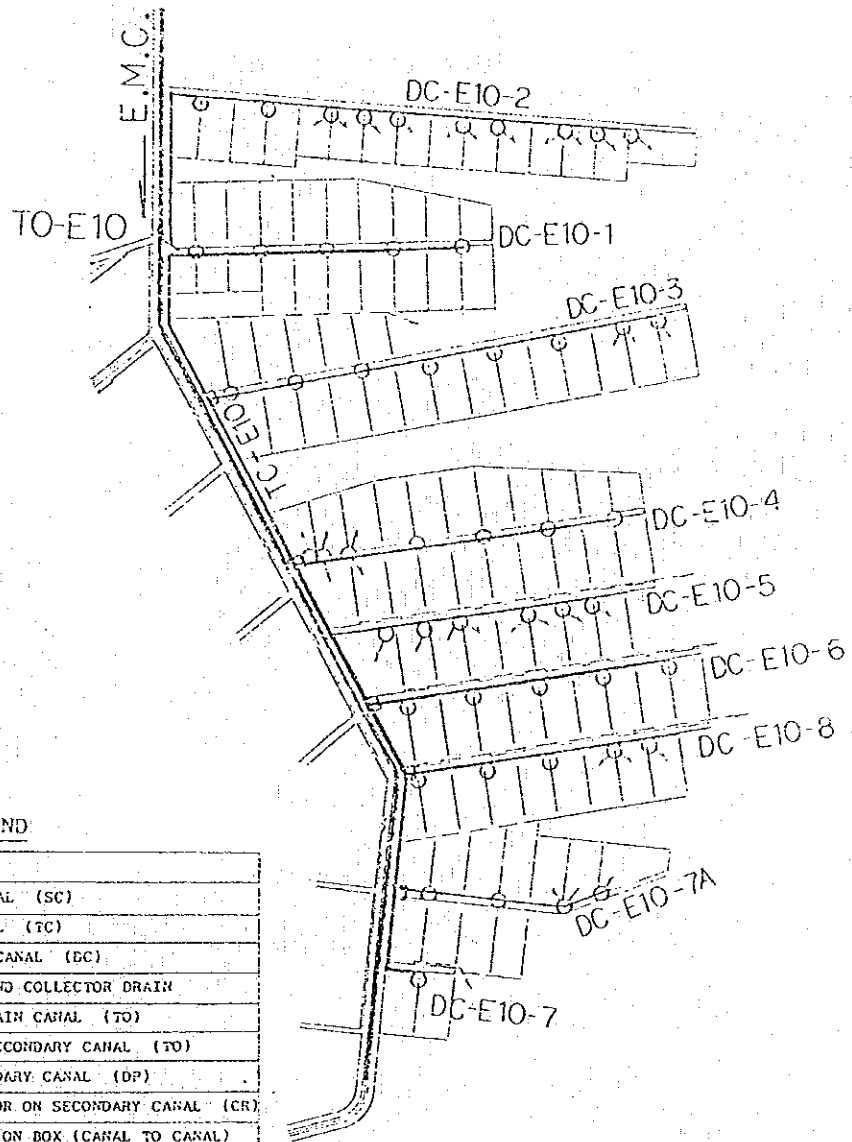


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	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
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	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

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SCALE



LEGEND

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	TERTIARY CANAL (TC)
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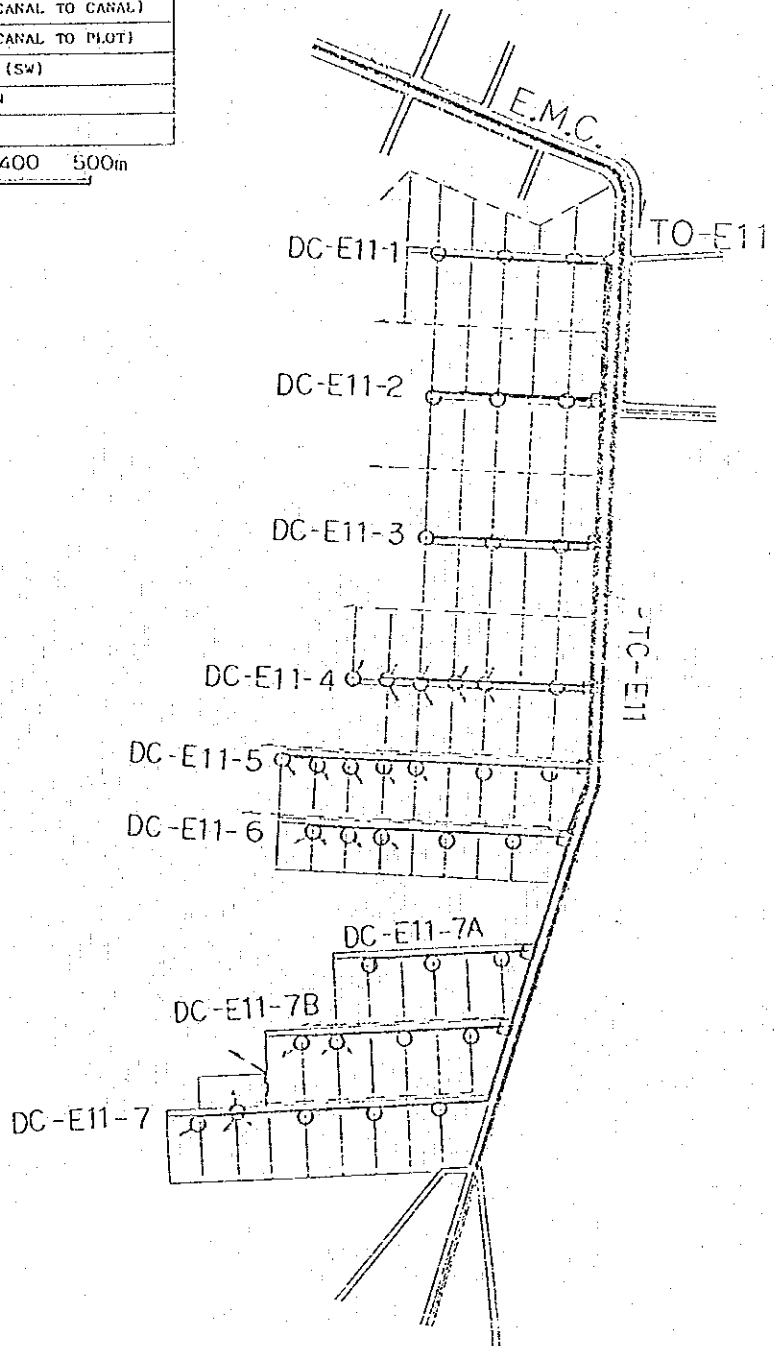
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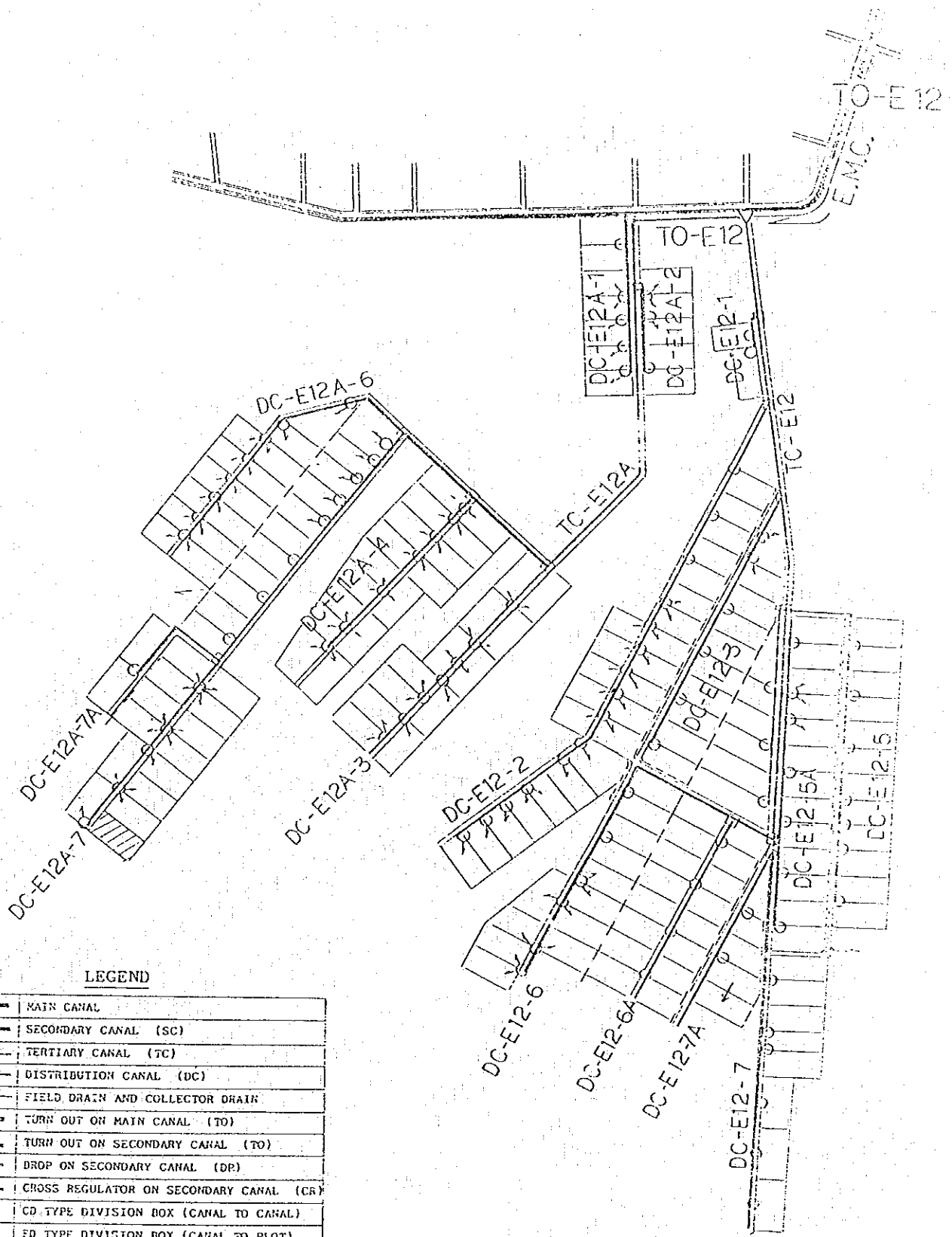
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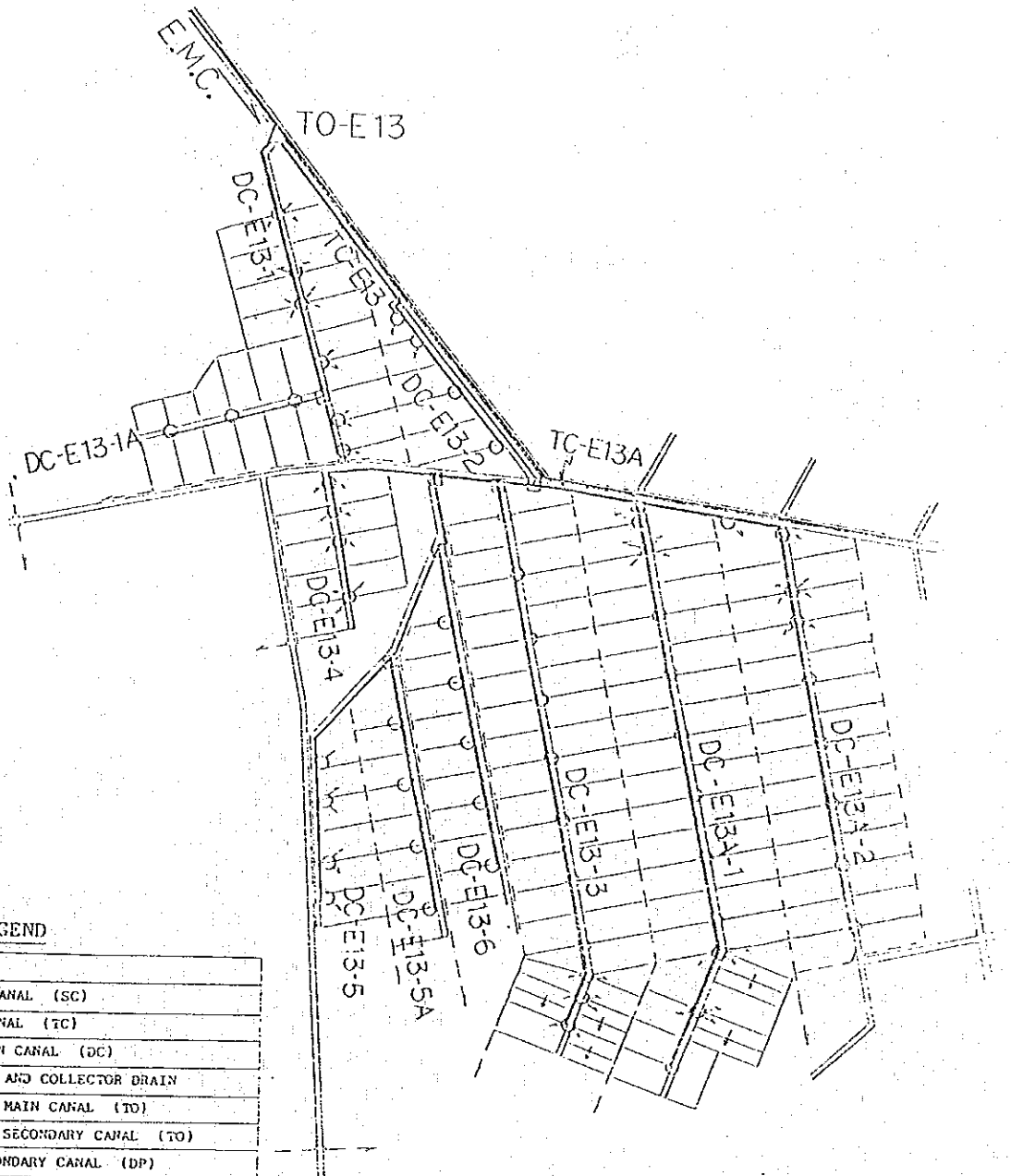


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SCALE



LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE

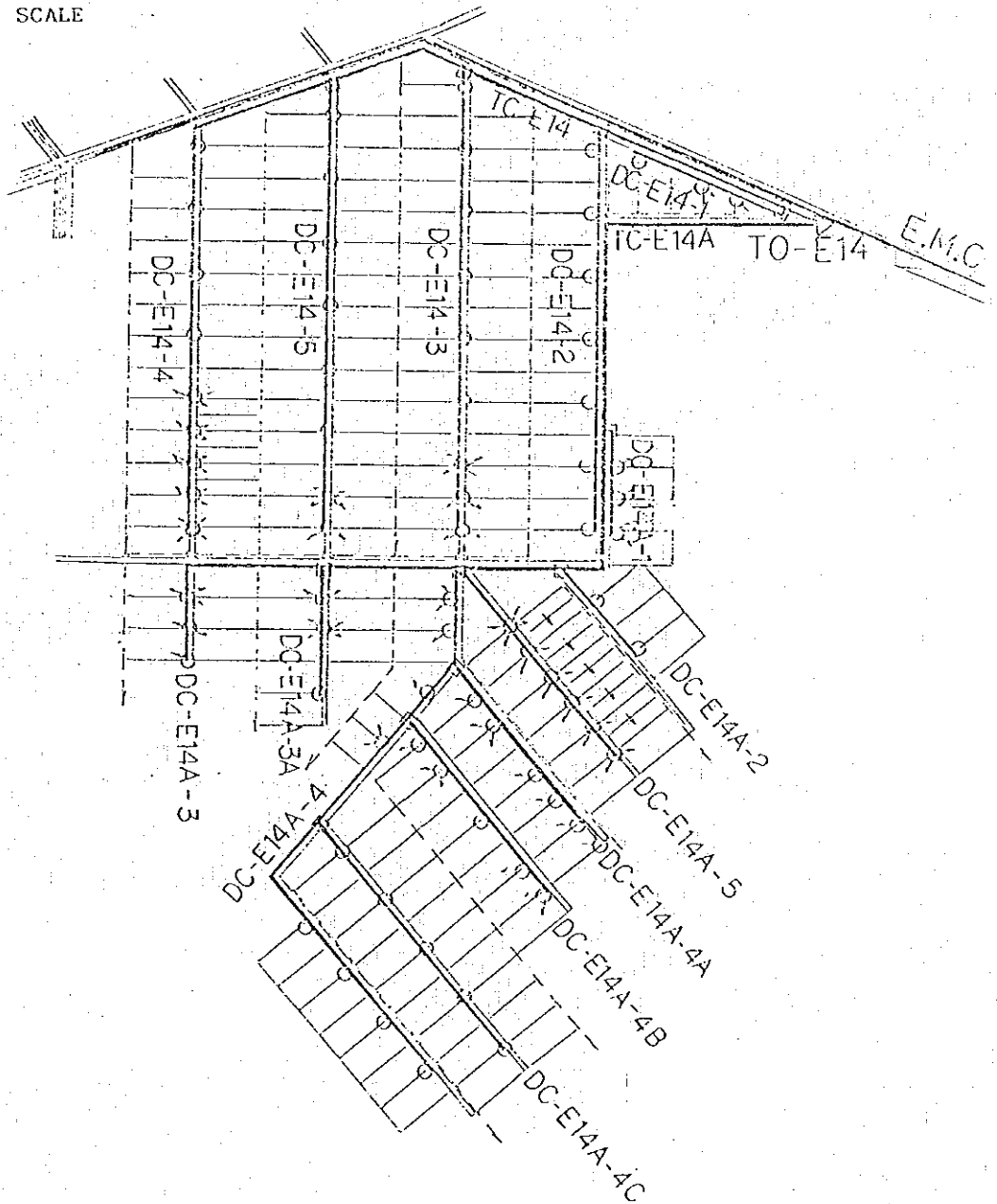
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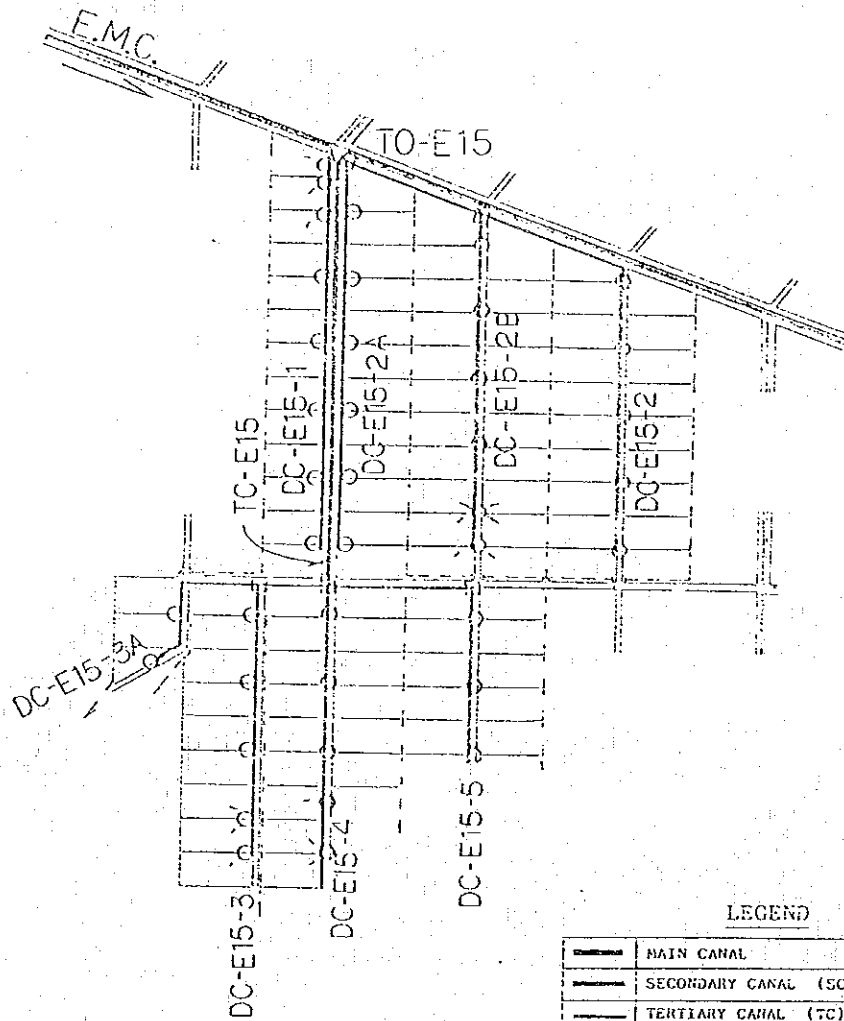
	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DRGP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE

TO-E1:





LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

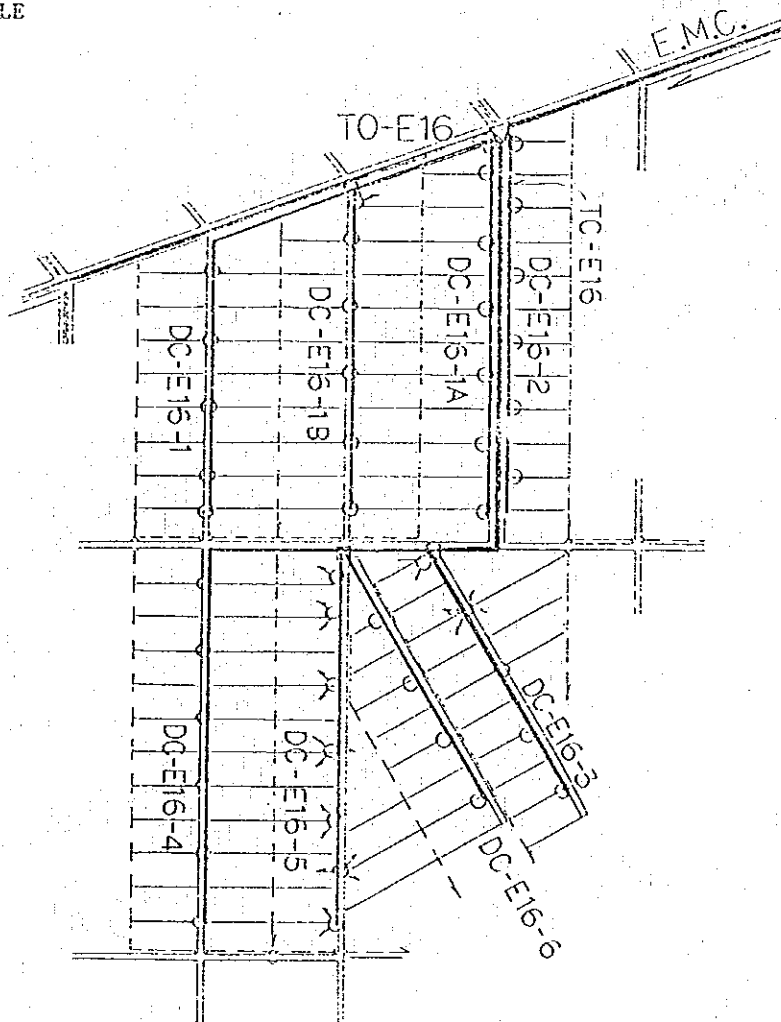
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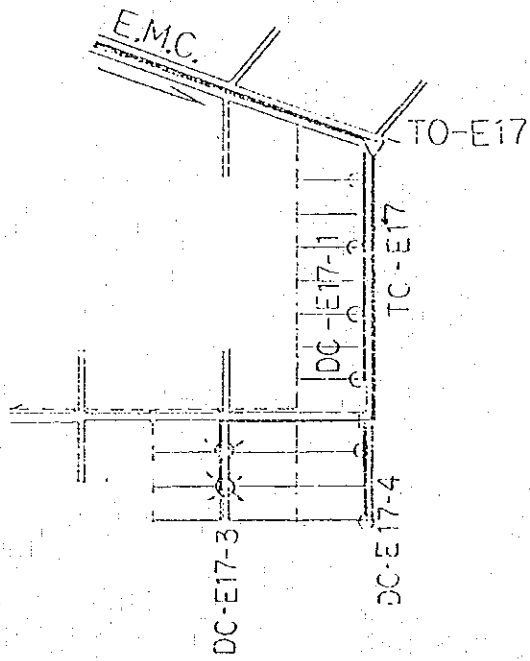
TO-E16

LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m
SCALE



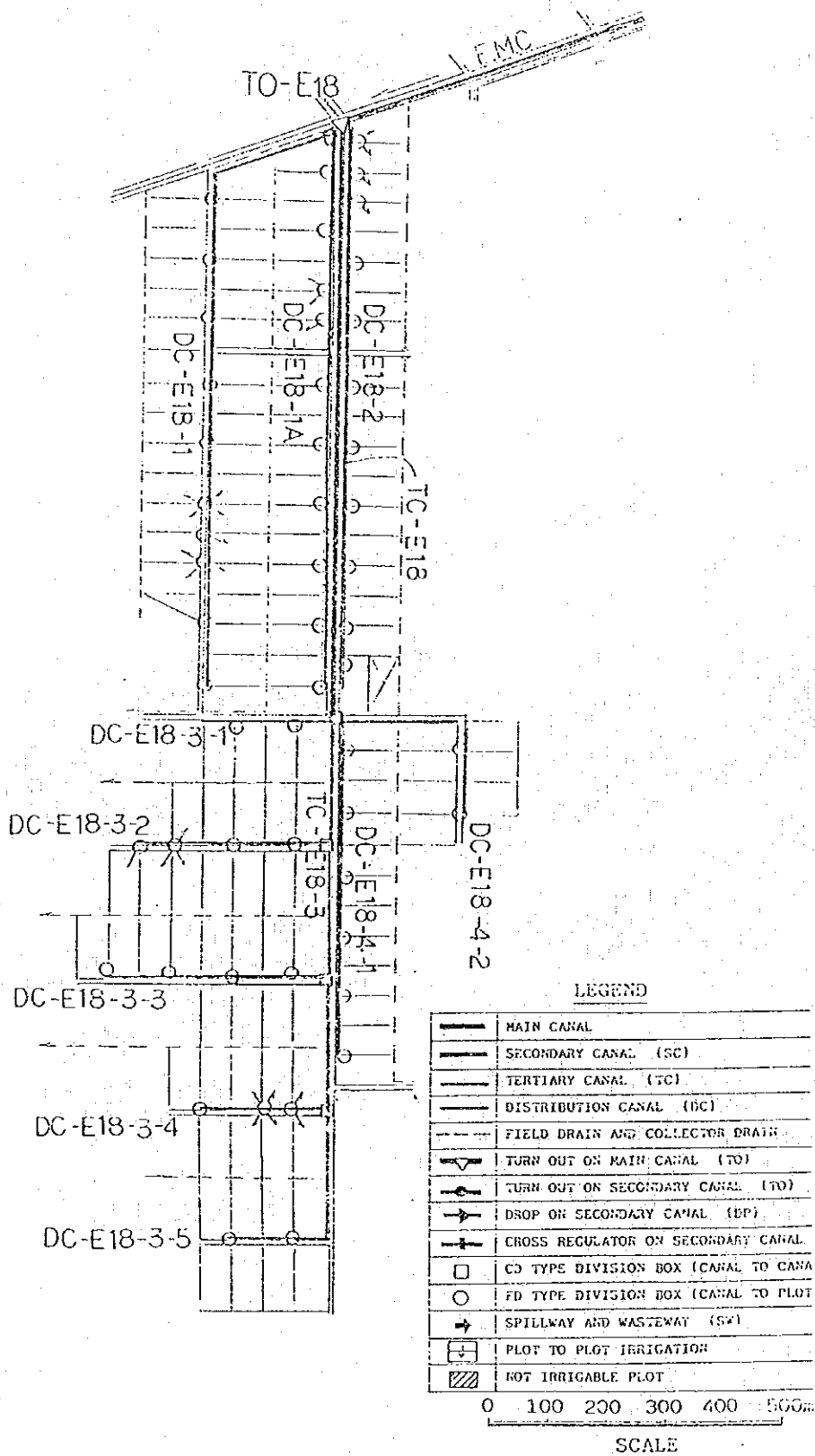


LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE



LEGEND

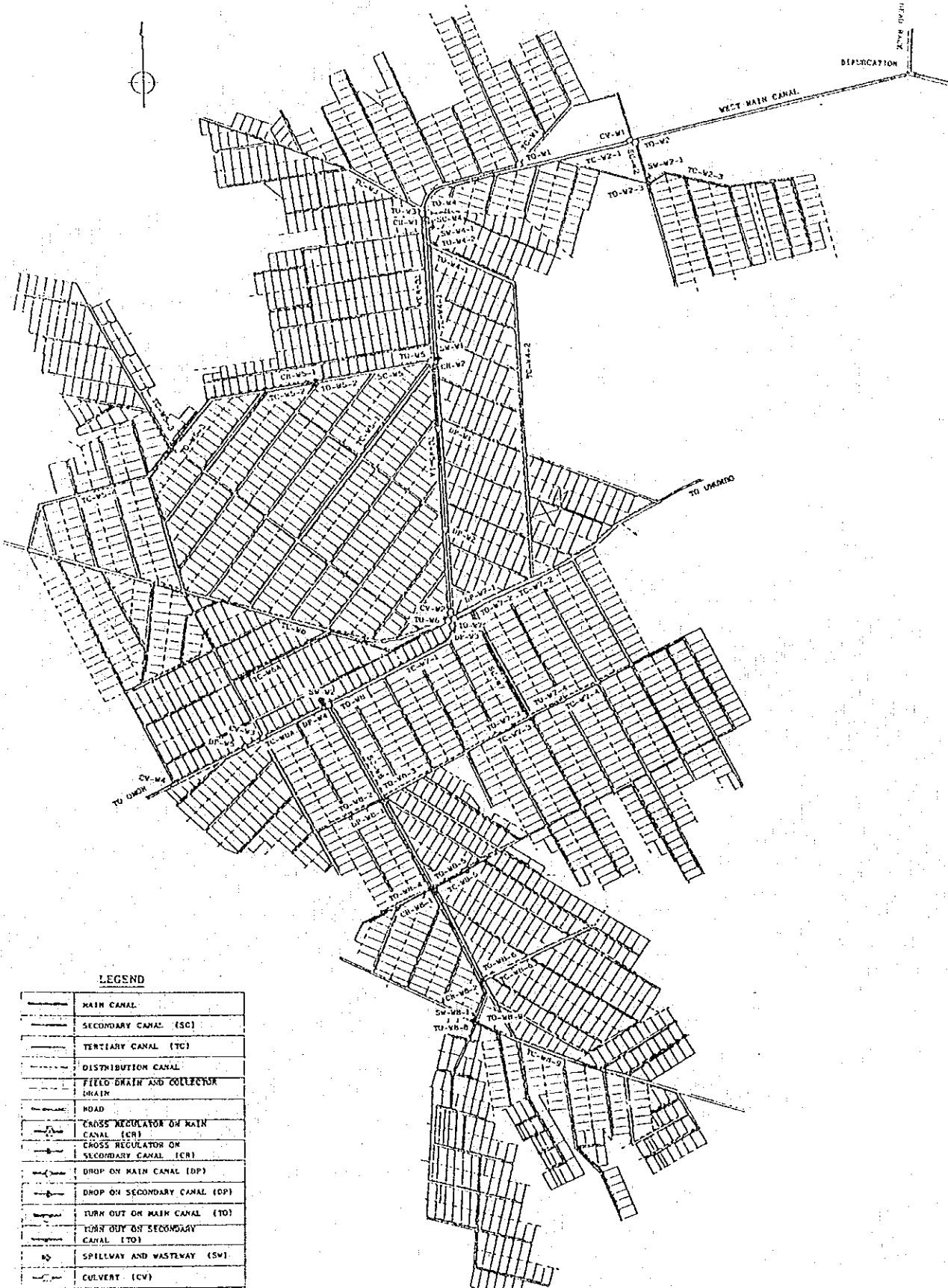
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	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (BP)
	CROSS REGULATOR ON SECONDARY CANAL
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE

GENERAL LAYOUT

NW-ZONE



LEGEND

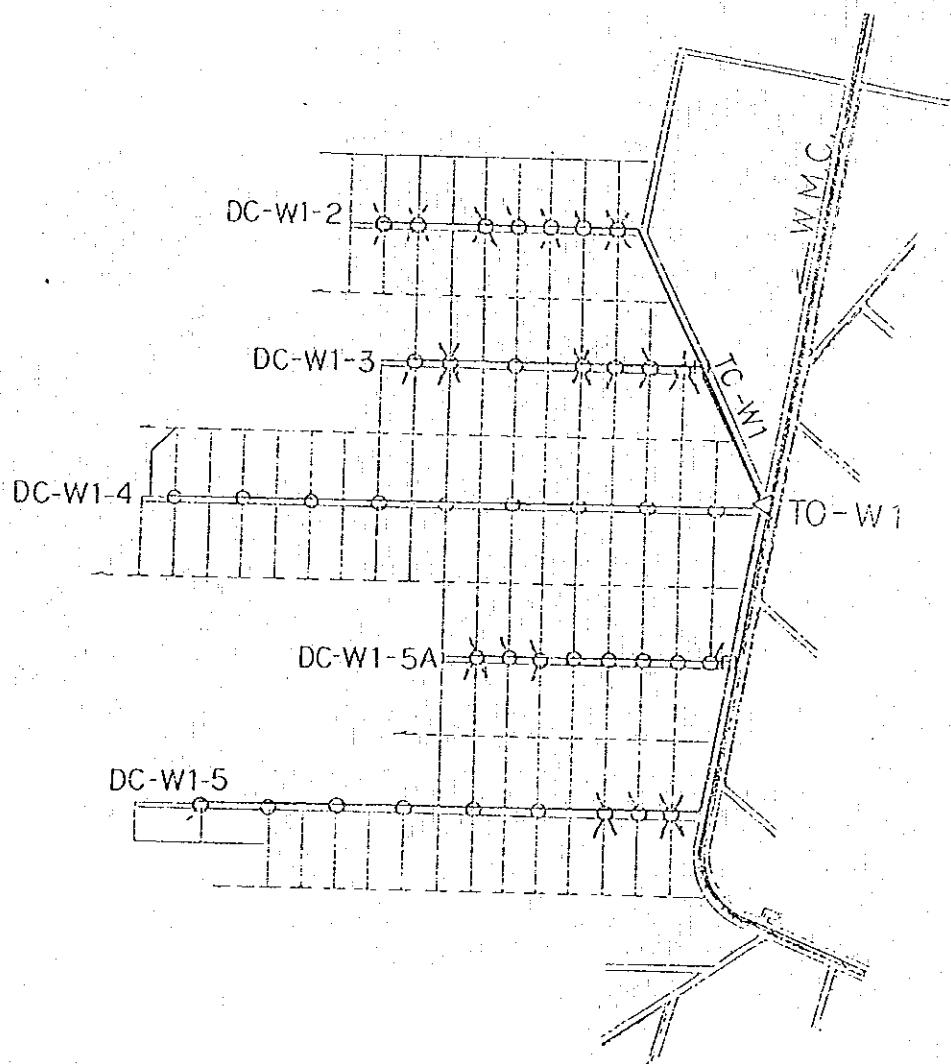
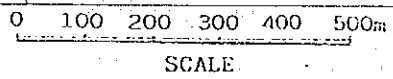
	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL
	FIELD DRAIN AND COLLECTOR DRAIN
	ROAD
	CROSS REGULATOR ON MAIN CANAL (CR)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	DROP ON MAIN CANAL (DP)
	DROP ON SECONDARY CANAL (DP)
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	SPILLWAY AND WASTEWAY (SW)
	CULVERT (CV)

0 500 1000m
SCALE

TO-W1

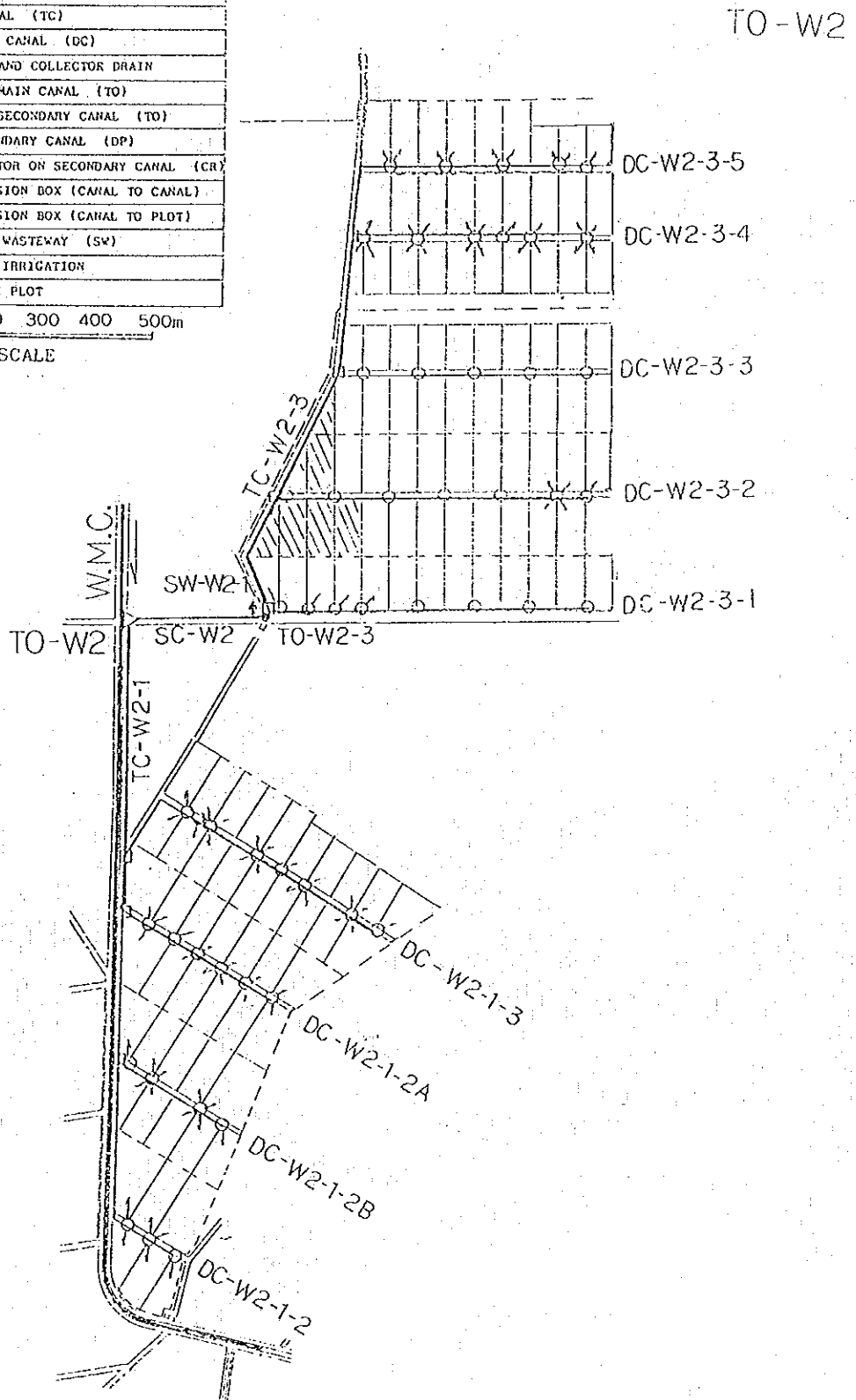
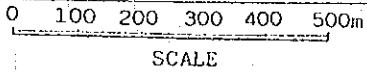
LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT



LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT



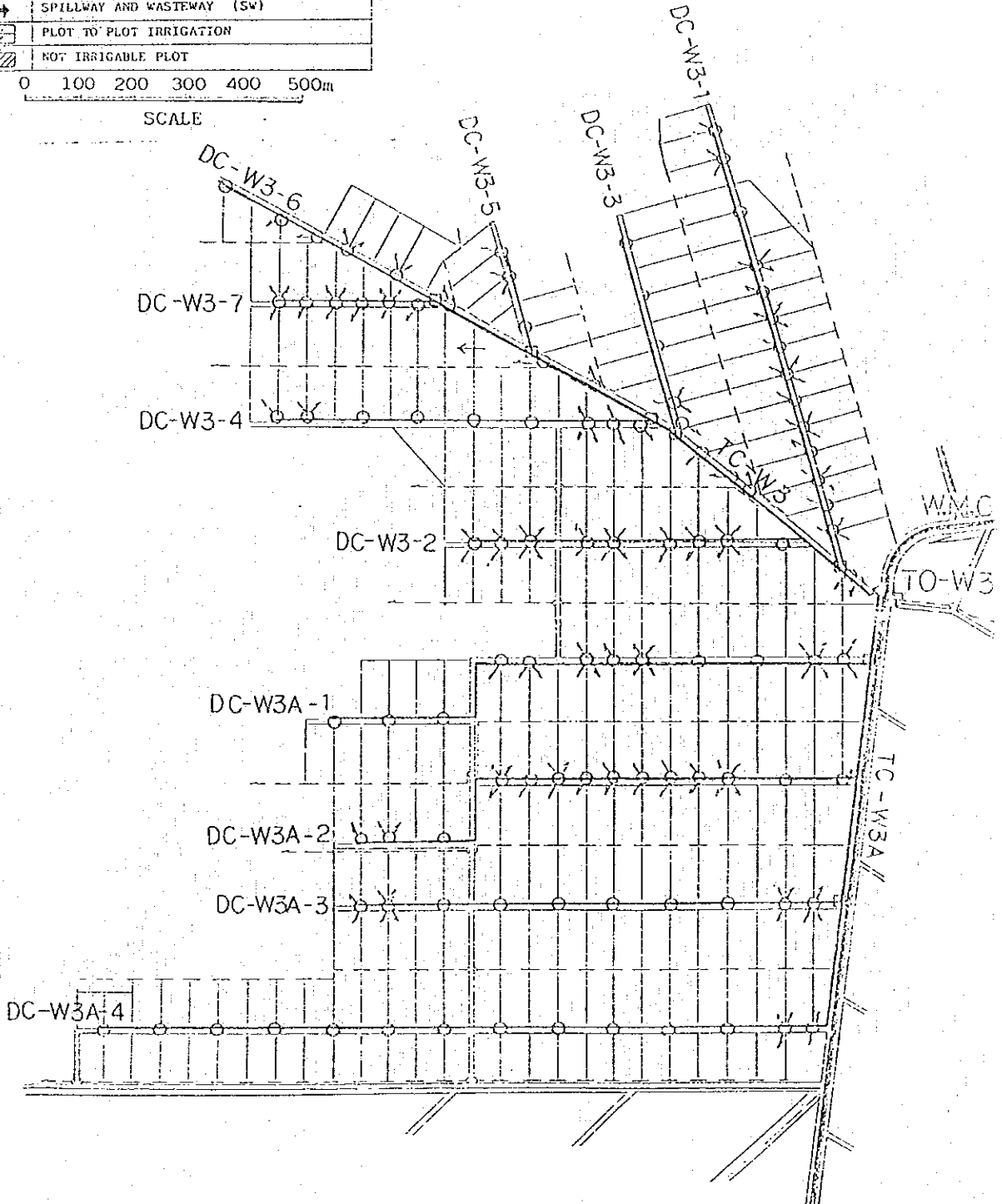
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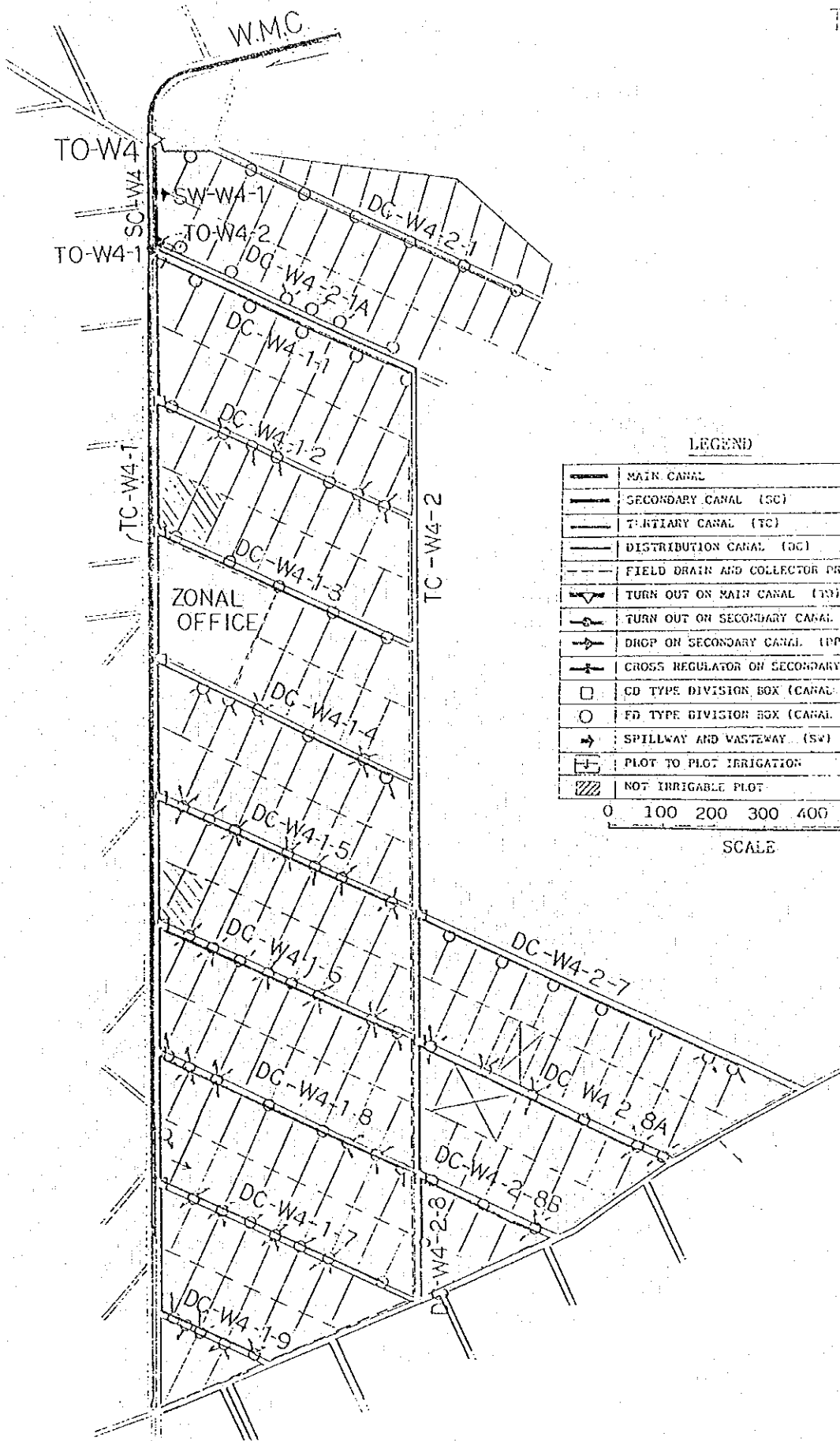
TO-W3

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE





TO-W4

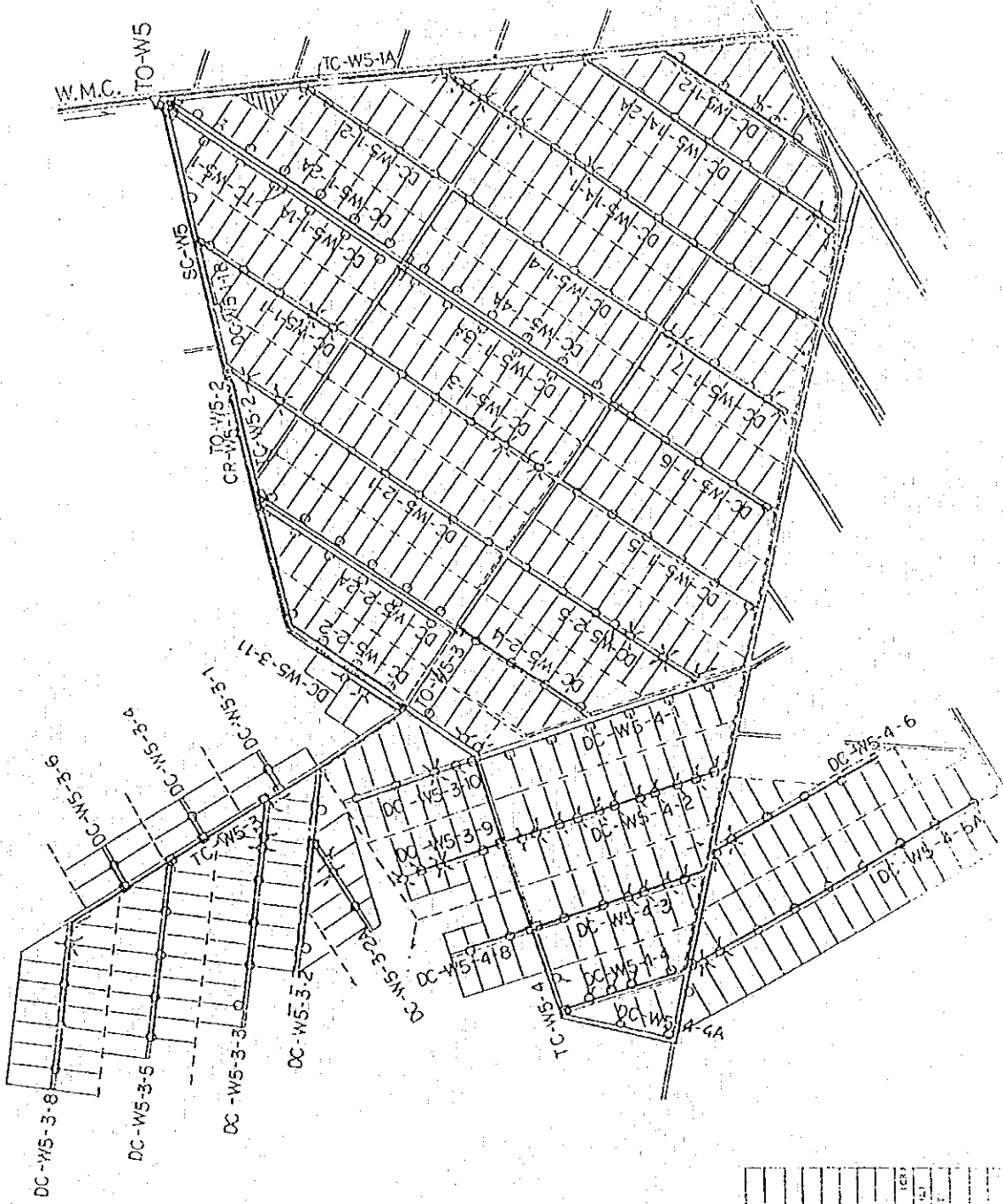
LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TM)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE

TO-W5



LEGEND

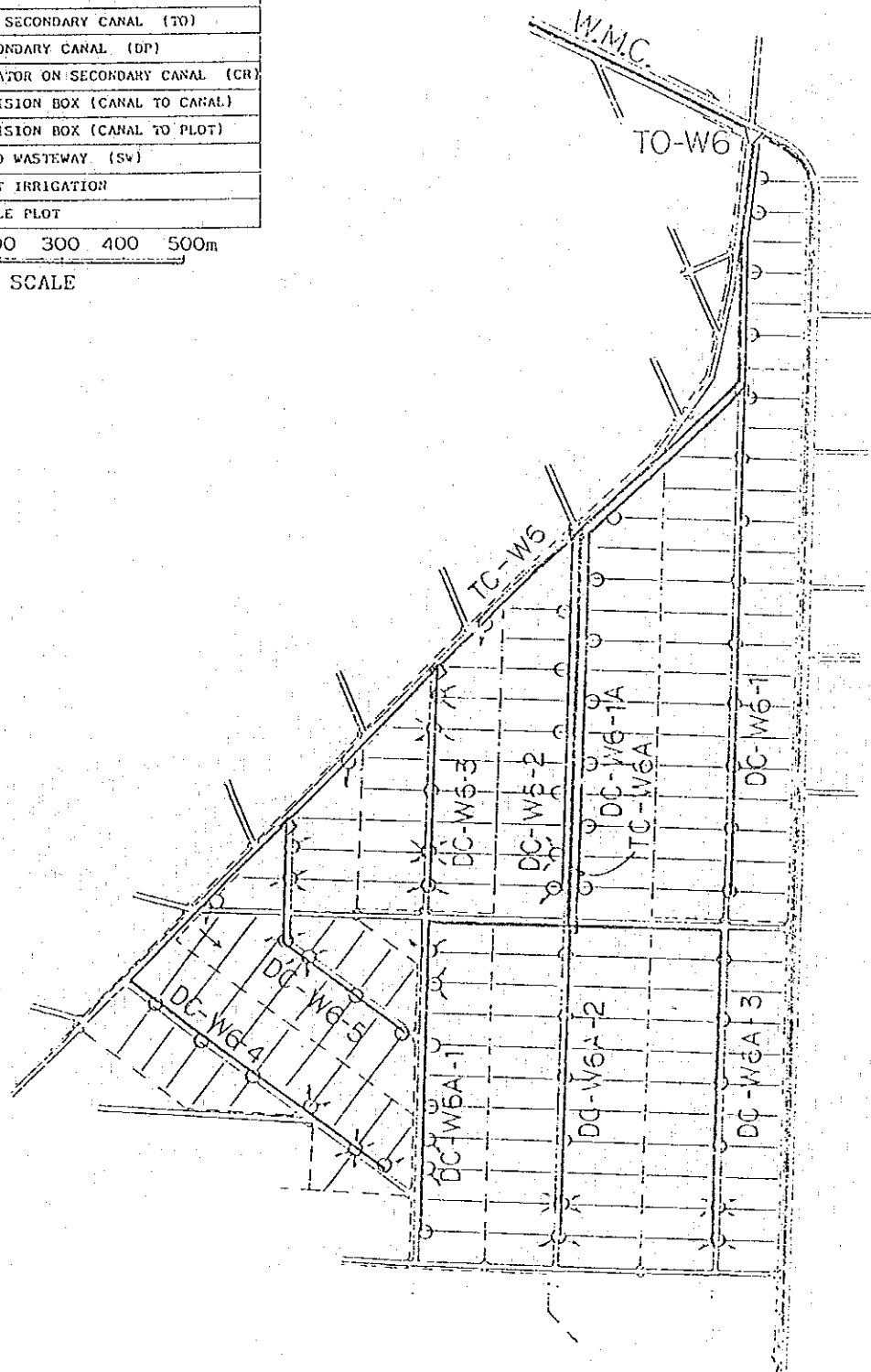
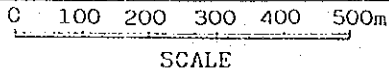
—	MAIN CANAL
—	SECONDARY CANAL (SC)
—	TERTIARY CANAL (TC)
—	DISTRIBUTION CANAL (DC)
—	FIELD DRAIN AND COLLECTION DRAIN
—	TURN OUT ON MAIN CANAL (TO)
—	DROP ON SECONDARY CANAL (DP)
—	CROSS RESTRICTION ON SECONDARY CANAL (CR)
—	TURN OUT ON TERTIARY CANAL (TO)
—	TURN OUT ON DISTRIBUTION CANAL (TO)
—	SPILLWAY AND PASSWAY (SP)
—	WATER TO FERTILIZATION (WF)

0 100 200 300 4.0 5.0

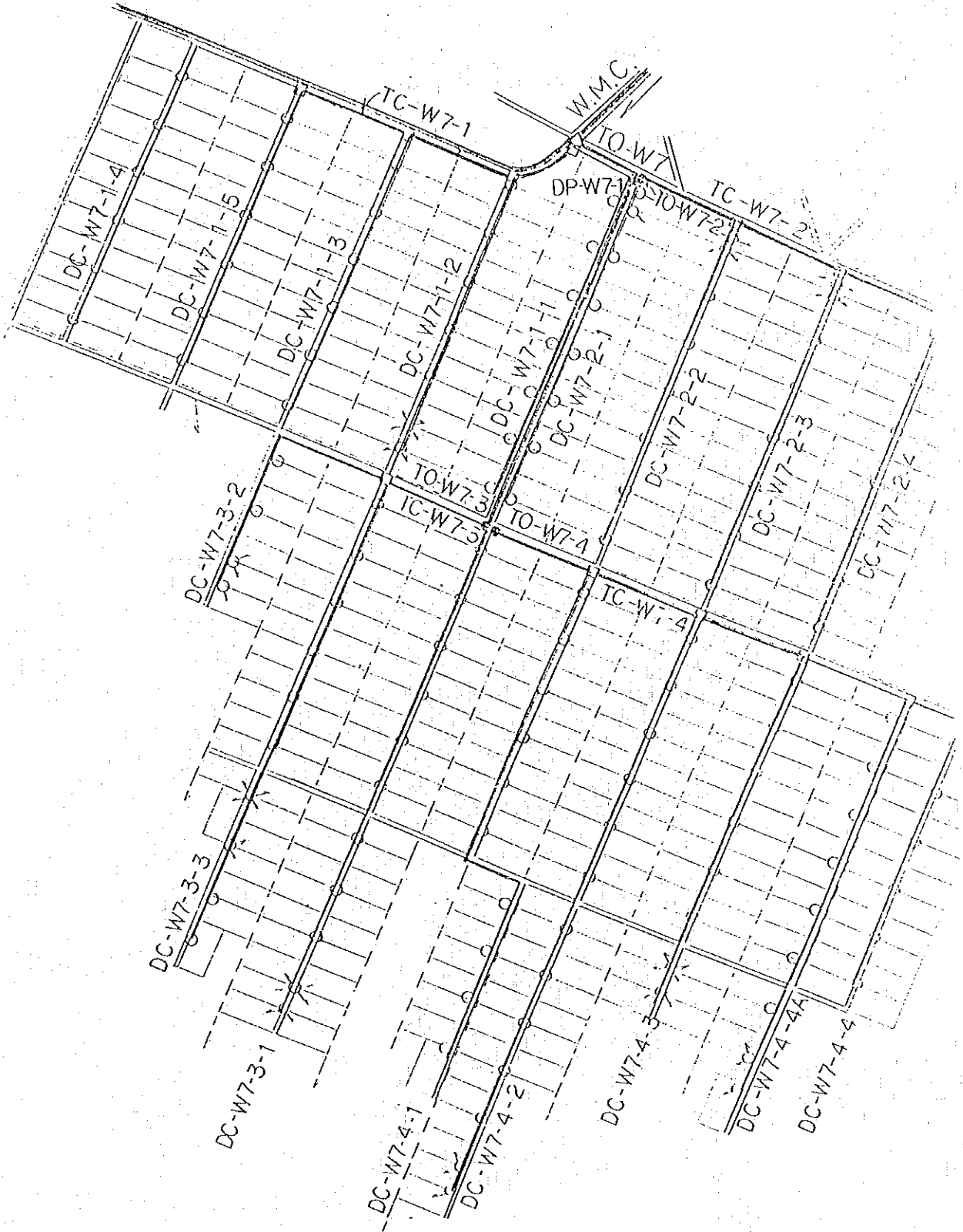
TO-W6

LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT



TO-W7

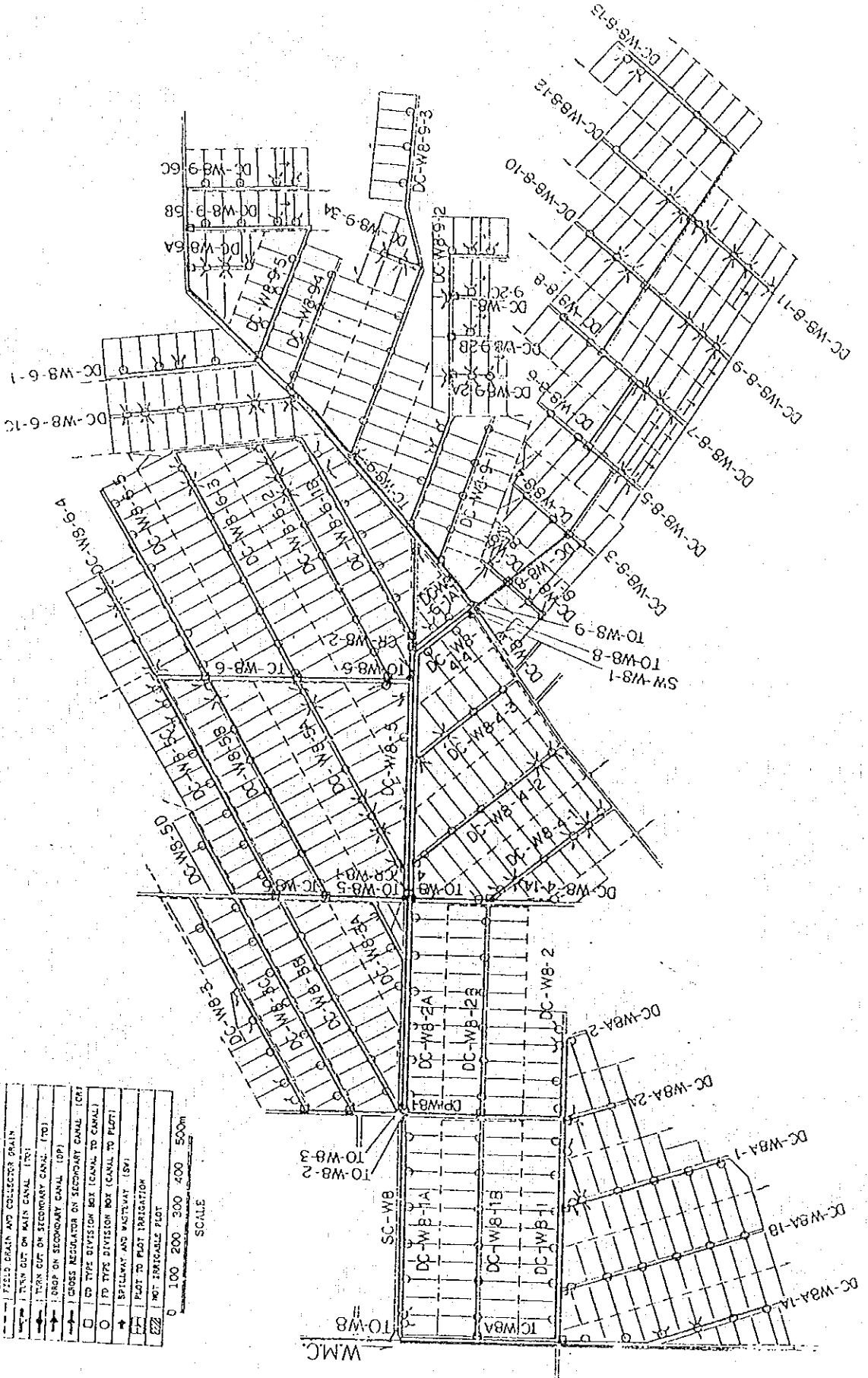


SM-01.

LEGEND

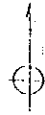
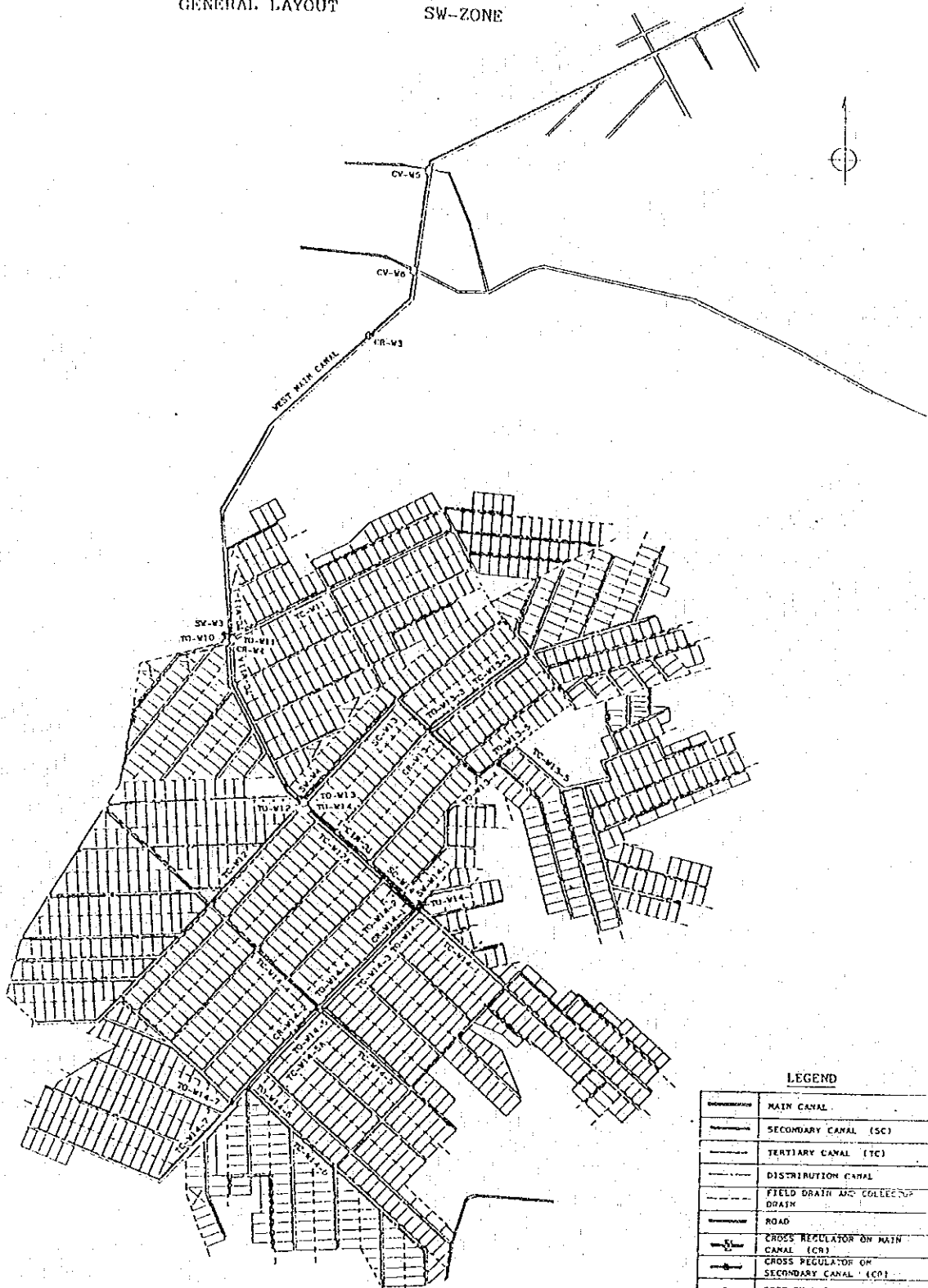
	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TS)
	DROP ON SECONDARY CANAL (DP)
	GROSS REGULATOR ON SECONDARY CANAL (GR)
	SD TYPE DIVISION BOX (CANAL TO CANAL)
	TD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

SCALE
0 100 200 300 400 500m



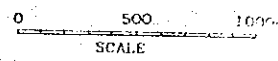
GENERAL LAYOUT

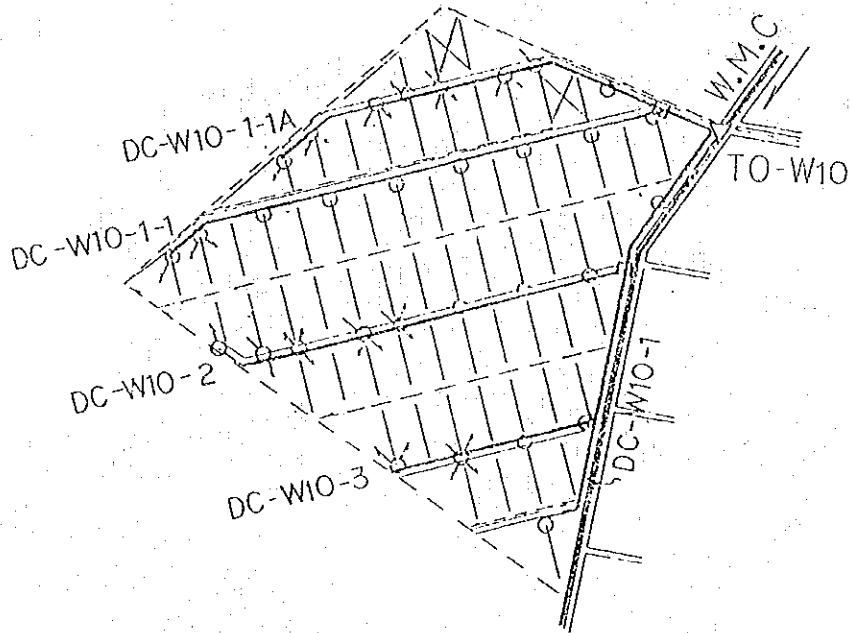
SW-ZONE



LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL
	FIELD DRAIN AND COLLECTOR DRAIN
	ROAD
	CROSS REGULATOR ON MAIN CANAL (CR)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	DROP ON MAIN CANAL (DP)
	DROP ON SECONDARY CANAL (DP)
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	SPILLWAY AND WASTEWAY (SW)
	CULVERT (CV)





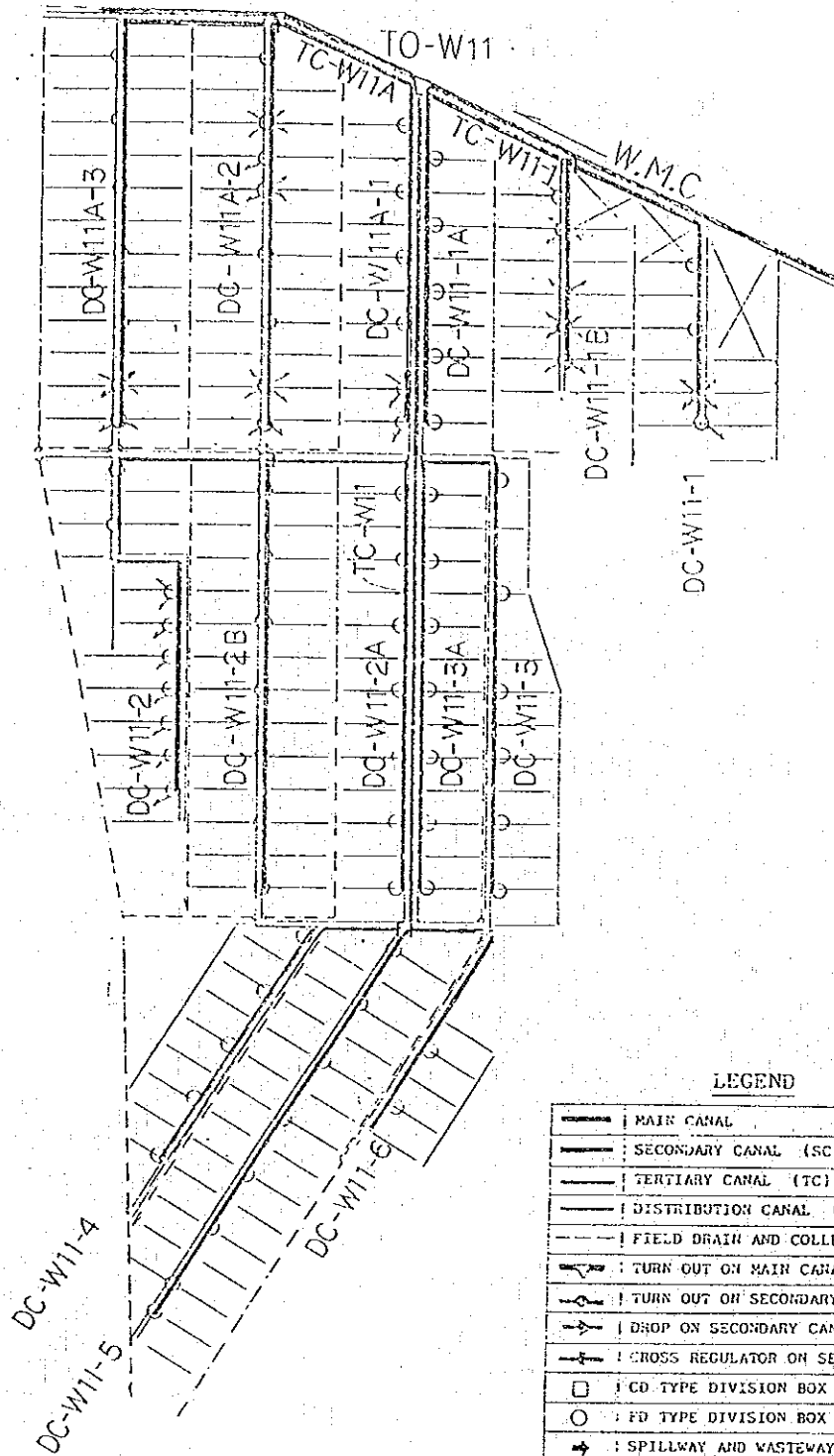
LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE

TO-W11

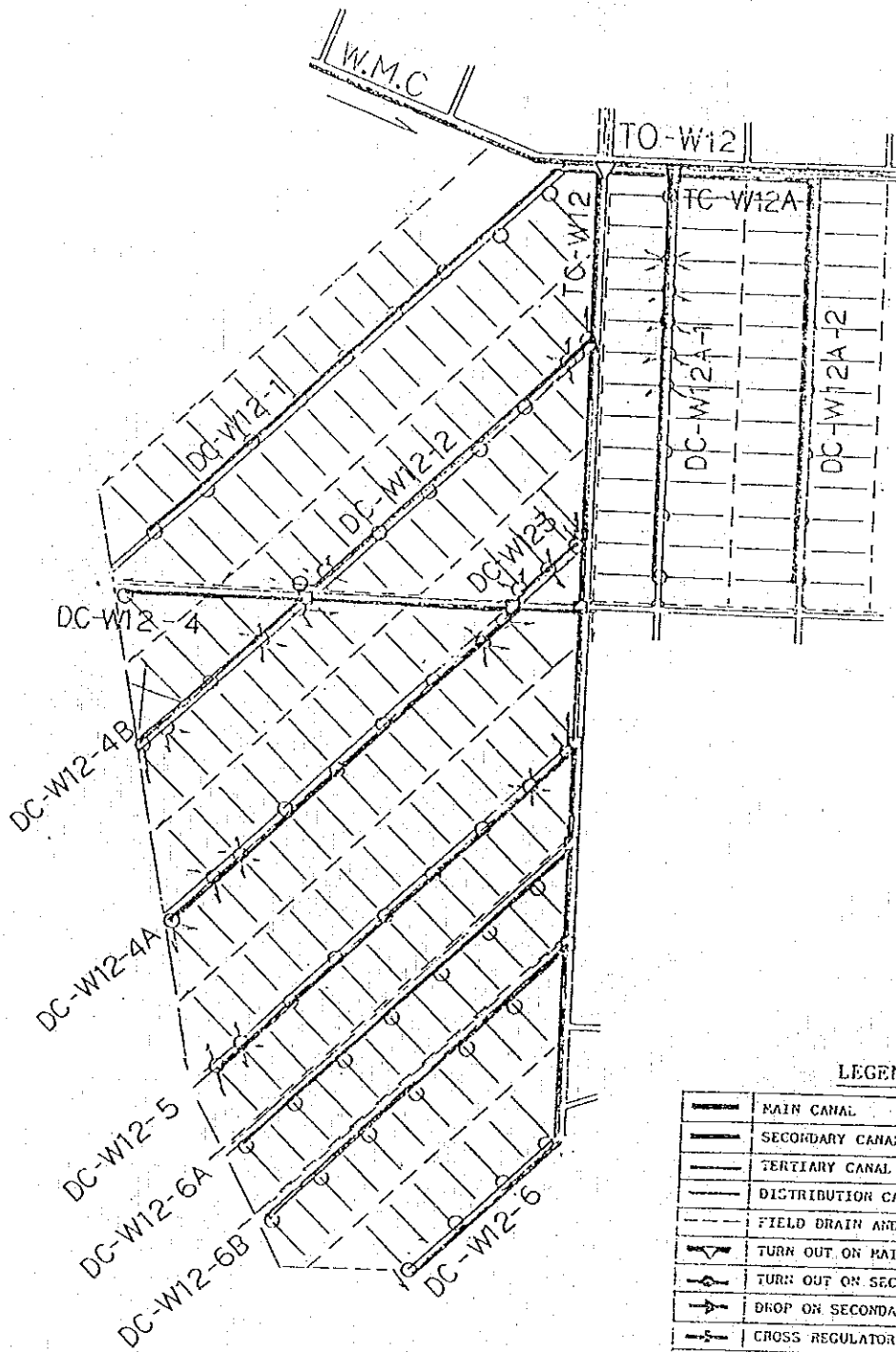


LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

SCALE



LEGEND

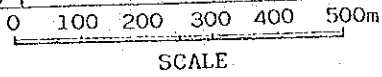
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	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (DP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (S*)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT

0 100 200 300 400 500m

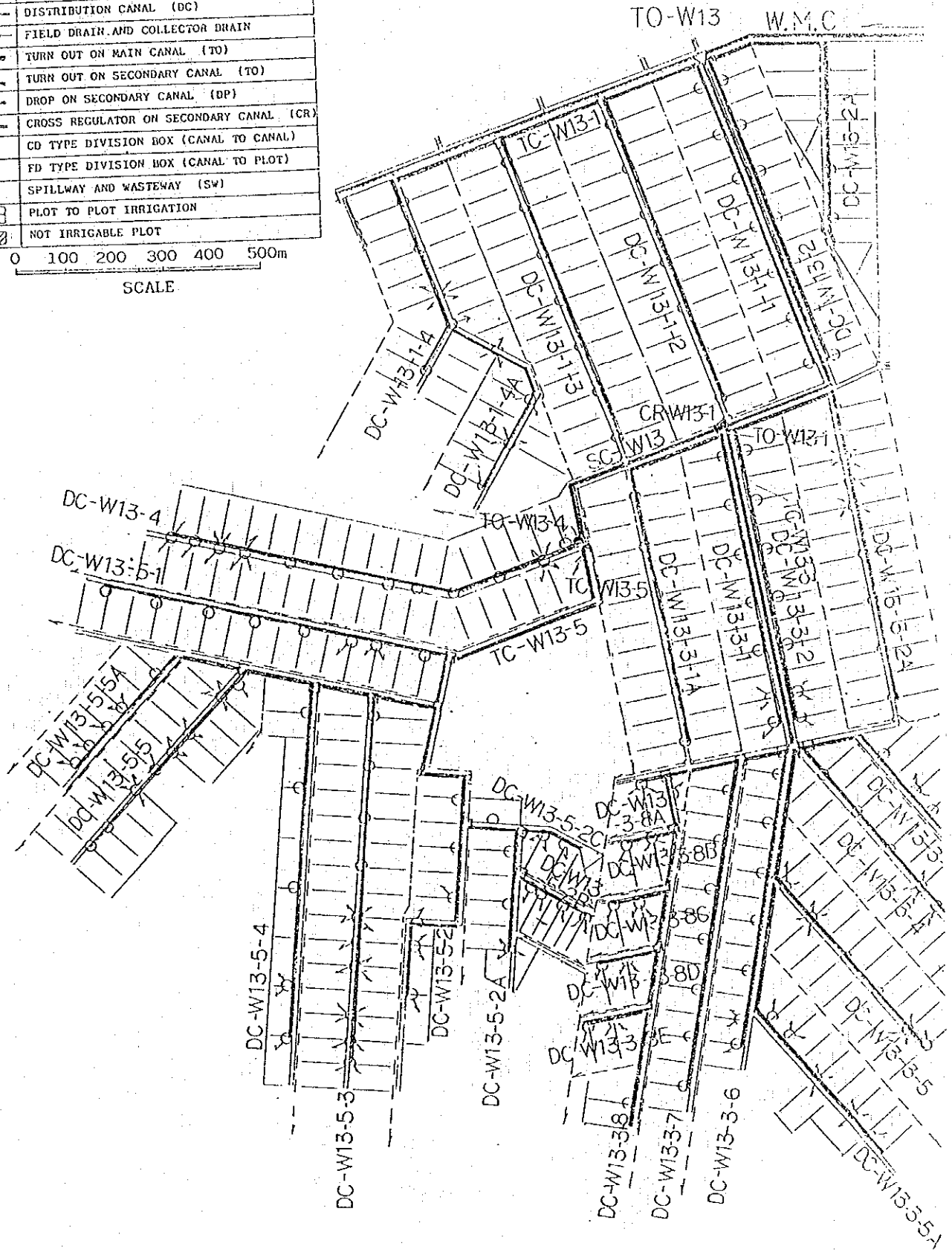
SCALE

LEGEND

	MAIN CANAL
	SECONDARY CANAL (SC)
	TERTIARY CANAL (TC)
	DISTRIBUTION CANAL (DC)
	FIELD DRAIN AND COLLECTOR DRAIN
	TURN OUT ON MAIN CANAL (TO)
	TURN OUT ON SECONDARY CANAL (TO)
	DROP ON SECONDARY CANAL (BP)
	CROSS REGULATOR ON SECONDARY CANAL (CR)
	CD TYPE DIVISION BOX (CANAL TO CANAL)
	FD TYPE DIVISION BOX (CANAL TO PLOT)
	SPILLWAY AND WASTEWAY (SW)
	PLOT TO PLOT IRRIGATION
	NOT IRRIGABLE PLOT



TO-W13



3. 免稅關係文書

Extraordinary



Federal Republic of Nigeria Official Gazette

No. 4

Lagos - 19th January, 1988

Vol. 75

Government Notice No. 43

The following is published as Supplement to this Gazette :—

	<i>Short Title</i>	<i>Page</i>
S.I. 1	Customs Tariff (Export Prohibition) Order 1988	B1

Printed and Published by The Federal Government Press, Lagos, Nigeria
FGPL 11/388/10,000

Annual Subscription from 1st January, 1988 is Local : N150.00 Overseas : N200.00 (Surface Mail), N250.00 (Second Class Air Mail). Present issue (including Supplement N2.00 per copy. Subscribers who wish to obtain Gazette after 1st January should apply to the Federal Government Printer, Lagos for amended Subscription.

Supplement to Official Gazette Extraordinary No. 4, Vol. 75, 19th January,
1988—Part B

S.I. 1 of 1988

CUSTOMS, EXCISE TARIFF, ETC. (CONSOLIDATION)
DECREE 1988
(1988 No. 1)

Customs Tariff (Export Prohibition) Order 1988

Commencement : 18th January 1988

In exercise of the powers conferred upon me by section 10 (1) of the Customs, Excise Tariff, etc. (Consolidation) Decree 1988 and of all other powers enabling me in that behalf, I, IBRAHIM BADAMASI BABANGIDA, President, Commander-in-Chief of the Armed Forces, Federal Republic of Nigeria, hereby give the following Order :—

- | | |
|---|--|
| <p>1.—(1) As from the commencement of this Order, the following grains shall be absolutely prohibited from exportation for the purposes of trade—</p> <p>(a) maize (Corn) (H.S. Code 1005.10 to 1005.90)</p> <p>(b) grain sorghum (H.S. Code 1007.00)</p> | <p>Absolute prohibition of grains for exportation.</p> |
| <p>2. This Order may be cited as the Customs Tariff (Export Prohibition) Order 1988.</p> | <p>Citation.</p> |

MADE at Lagos this 18th day of January 1988.

GENERAL I. B. BABANGIDA,
*President, Commander-in-Chief
of the Armed Forces,
Federal Republic of Nigeria*

SCHEDULE 2

EXEMPTION FROM IMPORT DUTY

1. Aircraft, their parts and ancilliary equipment, if the Minister is satisfied that the same are imported by foreign airlines providing scheduled services solely for direct use in the operation of aircraft or the maintenance or repair of aircraft or their parts, the following items, parts and components of the same :

- (1) air-conditioning plant ;
- (2) catering equipment ;
- (3) engine starting trolleys ;
- (4) freight hoists ;
- (5) fuelling plants ;
- (6) inspection platforms ;
- (7) instruments ;
- (8) materials for internal or external renovation or re-decoration ;
- (9) passenger gangways ;
- (10) tools (including machine tools) and machinery (other than vehicles).

2. Films, films-strips, microfilms, newsreel, slides and similar visual and auditory material of educational, scientific or cultural character imported by the United Nations, any of its specialised Agencies or an approved education or science-organisation.

3. Fuel, lubricants and similar Products, which the Minister is satisfied are necessary for and will be used solely in the operation of :

1. aircraft of the armed forces of a foreign power ; or
2. civil aircraft registered in a country recognised by the Federal Republic of Nigeria.

4. Goods Imported by Voluntary Organisation

Goods accepted by the Minister as necessary and appropriate for equipping the members (including their officers) of a voluntary organisation which is not profit-making, enjoys international recognition, and is approved by the Minister where he is satisfied that adequate arrangements have been made for the legitimate use of the goods and that the goods are necessary and appropriate for the successful prosecution of the aims and objectives of the organisation.

5. Goods for Donation to Charity

Goods approved by the Minister for donation to charity, where he is satisfied that the goods are provided or donated on humanitarian grounds and if the donor is :

1. an established body recognised by the Government of the country of the place of establishment ;
2. or a person or body approved by the Federal Government of Nigeria or approved by a person authorised by the Government in that behalf.

6. Goods Imported for the President, Commander-in-Chief of the Armed Forces:

All goods imported for the official and personal use of the President, Commander-in-Chief of the Armed Forces of the Federal Republic of Nigeria, or any person for the time being acting as the Head of the Federal Republic of Nigeria, during such period of time as he is so acting :

Provided that the foregoing provisions of this paragraph shall not apply to goods which the Minister is satisfied are produced locally to the required standard and readily obtainable.

7. Goods Imported for Consular officers

All goods imported for the official and personal use of a Consular Officer or for the use of any member of the family of a Consular Officer, where the Government of the country he represents grants a like privilege to Nigerian Consular Officers in that country :

For the purpose of this paragraph, the expression "Consular Officer"

(a) means a Consular Officer *de carrière* who is recognised as a Consular Officer by the Government of the country he represents and is a national of that country ; and

(b) includes, in relation to any country which is declared by the President, Commander-in-Chief of the Armed Forces of the Federal Republic of Nigeria to be a country with the Government of which a convention making provision in that behalf has been conducted, a person who :

(i) is employed by the Government at a Consulate otherwise than, on domestic duties :

(ii) is a national of that country ;

(iii) is not otherwise engaged in gainful occupation in Nigeria ; and

(iv) if not a permanent employee of that Government, was not resident in Nigeria at the time when his employment at the Consulate began.

The provisions of this paragraph shall be deemed to have had effect from the date from which any convention or agreement is entered into between the Government of the Federal Republic of Nigeria and the foreign government concerned :

Provided that where any vehicle imported into Nigeria under this paragraph has thereafter been exported from Nigeria, the vehicles shall not be re-imported into Nigeria without the consent of the Federal Government.

8. Diplomatic Privileged Importations

The furniture and effects (which expression shall include a motor vehicle) of any person, not being a Nigerian who is an official of an organisation declared by notice in the *Gazette* to be an organisation of which the Government for one or more sovereign powers are members at the time that such person first takes up his post in Nigeria :

Provided that where any vehicle imported into Nigeria under this paragraph has thereafter been exported from Nigeria, the vehicle shall not be re-imported into Nigeria without the consent of the Federal Government.

9. Technical Assistance Importations

1. All goods imported for the purpose of directly implementing any project arising within any scheme of technical assistance approved by the Government of the Federation ; and

* 2. The furniture and effects (which expression shall include a motor vehicle and an air-conditioner) of any person, at the time such person first takes up post in Nigeria, who is in Nigeria under any such scheme of technical assistance :

Provided that where any vehicle imported into Nigeria under this paragraph has thereafter been exported from Nigeria, the vehicle shall not be re-imported into Nigeria without the consent of the Federal Government, and that when any such goods are sold in Nigeria, appropriate duty shall be paid on their value at that time.

10. Passengers Baggage

(1) Personal and household effects, the property accompanying a passenger, to the extent permitted by the Minister and subject to any conditions imposed by it :

(2) Personal and household effects, the property of a passenger landed at any Customs Port, Customs Airport or Customs station within two months of the arrival of the passenger within such further period as the Minister may allow, to the extent permitted by the Minister and subject to any conditions imposed by it ; and

(3) Personal and household effects excluding jewellery, photographic equipment electronics and other luxury goods of a citizen of Nigeria who had been resident in a place outside the limits of the jurisdiction of Nigeria for not less than 9 months.

Provided that "baggage" shall not be interpreted to include any vehicle or any goods intended for sale, barter or exchange.

11. Patterns and Samples, cut mutilated spoiled or otherwise rendered unmerchantable ; articles which the Minister is satisfied are not imported for trade purposes and which in the opinion of the Minister are of no commercial value ; advertising materials of no commercial value accepted as such by the Minister, and commercial sample of negligible value intended solely for soliciting orders or goods of a kind they represent, provided the quality, size, kind or quantity and manner in which they are put up preclude their being used otherwise than as samples.

12. Personal Effects, not being merchandise, of a citizen of Nigeria dyeing in places outside the limits of the jurisdiction of Nigeria.

13. Scientific Specimens, imported for public exhibition, study or research.

14. Foodstuff (of the type ordinarily consumed by Africans) produced in a territory adjoining Nigeria and imported overland from any such territory in such quantity as the Minister may from time to time specify.

15. Church and Mosque Equipment, accepted by the Minister as suitable and intended for use at religious services.

16. Life Saving Appliances.

17. Medicinal Preparations, drugs, anaesthetics and dressings excluding undiluted alcohol, alcohol diluted with water only or medicaments containing ten per cent or more by volume of ethyl alcohol imported by the Governments of the Federation.

18. Specialised Hospital and Surgical Equipment which in the opinion of the Minister charged with the responsibility for health matters is imported for use only in connection with surgical, dental and medical treatment including X-Ray Films and Plates.

19. Military Hardware and Uniforms

(1) All hardware imported officially for the use of the Nigerian Army, the Nigerian Navy or the Nigerian Air Force (other than alcoholic and non-alcoholic drinks, tobacco goods and products of food industry and as appropriate, any parts of such goods).

(2) Accoutrements, and Uniforms the property of Officers of the Nigerian Army, the Nigerian Navy or the Nigerian Air Force, imported by such officers for their PERSONAL USE ON DUTY as required by the regulations of their respective services.

Provided that the foregoing provisions of this paragraph shall not apply to goods which the Minister is satisfied are produced locally to the required standard and are readily obtainable.

20. Arms and Ammunition imported by the Nigerian Police Force.

21. In this Schedule, except otherwise provided, Minister means the Minister charged with responsibility for matters relating to finance.

Message No. 12345678

Chief Liaison Officer
Bureau Veritas
RIVAC 20
3rd Floor
3/5 Sulu Bolaji Street
P. O. Box 111
Lagos

Chief Liaison Officer
Cotecna International Limited
2A Rumsey Road
Ikoyi
Lagos

Chief Liaison Officer
Swede - Intertec
1 Engineering Close
Off Idowu Taylor Street
Victoria Island
Lagos

INDISCRIMINATE EXEMPTION FROM IMPORT
DUTY AND PRE-SHIPMENT INSPECTION

It has come to my attention that exemptions from import duty and pre-shipment inspection are being granted indiscriminately by some public sector organisations. The situation has become so scandalous that private sector organisations have even started issuing their own unauthorised exemptions. In order to check this undesirable development, Government has decided that:

- i) all exemptions from import duty issued since January 1, 1988 are hereby declared null and void and of no effect whatsoever;
- ii) the amounts of duty which ought to have been paid by all the importers indicated in (i) above shall be now

be ascertained and collected for payment into Government Treasury forthwith;

iii) henceforth import duty exemption certificates will be issued by the Budget Department of this Ministry only in respect of the items specifically stated in Schedule 2 of the Customs, Excise etc. (Consolidation) Decree No 1 of 1968. I shall from time to time inform you who the authorised signatories are and furnish you with the specimen signatures of such persons. Any correspondence on exemption from payment of import duty from any source, other than the authorised signatories from this Ministry, should therefore not be countenanced. The Inspection Agents must be satisfied as to the genuineness of such exemption certificates and ensure that such certificates are strictly utilized within the approved limits;

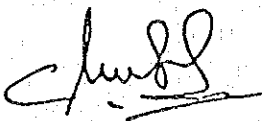
iv) consistent with the provisions of the Pre-shipment Inspection of Imports Decree No 36 of 1978 and its amendments, exemption from pre-shipment inspection will only be granted in respect of those specified under Section 5 of the Decree. In this regard, the Foreign Exchange and Trade Relations Department of my Ministry will issue exemptions when necessary. Likewise, in this case, I will inform you who the authorised

signatories are and furnish you with their specimen signatures;

- v) in all cases, you will also be notified of changes in ~~the signatories as and when appropriate;~~ and
- vi) all exemptions issued hitherto and hereafter, that are inconsistent with the above, are to be considered null and void.

I have already set up a Task Force in my Ministry to carry out the decision of Government indicated above. You are, therefore, requested to supply all the information at your disposal in connection with spurious import duty and pre-shipment exemption certificates issued and utilized since January 1988 to the Task Force through the Budget Department of this Ministry. You are also required to give the Task Force all other assistance which it may require for the satisfactory conclusion of its assignment.

Please ensure the effective implementation of the new arrangements for the approval and utilisation of import duty and pre-shipment inspection exemption certificates.



Chu S F Okongwu
Minister of Finance and
Economic Development

April 5, 1988

Ref. No. PSRU/C.16.1.11/79

7th April, 1988

To:

All Heads of Divisions/Sections
Establishments Department

SECRET

EXEMPTION FROM PAYMENT OF IMPORT
DUTY AND PRE-SHIPMENT INSPECTION

*11/1
C. M. Arulswala*

I am directed to forward herewith a copy of the Circular
Ref. No. BD.10643/S.2/T5/1 of 30th March, 1988 on the above-mentioned
subject for your information and necessary action.

C. M. Arulswala
for: Permanent Secretary.

SECRET

SR. (O/R)

CIRCULAR

Ref. No. BD.10643/S.2/T5/1

Federal Ministry of Finance
and Economic Development,
Federal Secretariat Complex I,
Ikoyi - Lagos.

30th March, 1988

Inspector General of Police

All Ministers,

Secretary to Federal Military Government,

Head of Civil Service of the Federation,

Governor, Central Bank of Nigeria,

All Federal Permanent Secretaries & Heads of
non-Ministerial Departments,

Secretaries to State Governments and Heads of
State Civil Services.

Exemption from Payment of Import Duty and
Pre-shipment Inspection

The Federal Military Government has observed that many government agencies have been involved in the granting of exemption from payment of import duty to various categories of public and private sector imports. The situation has deteriorated to the extent that private sector organisations are granting exemption from import duty. This practice has, among other things, led to substantial fall in revenue from Customs and Excise sources. The returns of revenue from these two sources for the first two months of this financial year have been very low when compared with the corresponding period for last year, even though the naira value of imports has, based on available statistics, been on the increase. It has therefore, become necessary that the process of granting exemption from import duty for all categories of import be properly streamlined and controlled so that the abuse inherent in the present arrangement can be removed once and for all. In this regard Government has decided that henceforth no Ministry, department, parastatal or agency of Government should grant exemption from import-

2. In his circular No. 11/3, 1/50 dated 25th January, 1988, the Secretary to the Federal Military Government has already conveyed the decision of the Federal Military Government not to grant any further exemption of import duty relating to government imports especially when those imports are being procured through contractors and suppliers. Consequently, applications for exemption from import duty will only be entertained in respect of the items of imports specifically indicated in Schedule 2 to Customs, Excise Tariff, Etc (Consolidation) Decree No. 1 of 1st January, 1988. Such applications should be directed to the Ministry of Finance and Economic Development for consideration and approval. It should be noted that the Customs and Excise Department will henceforth not entertain any correspondence for exemption from import duties emanating from any other Ministry, Department, or Parastatal other than the Ministry of Finance and Economic Development.

3. It should also be stated for ^{the} avoidance of doubt, that pre-shipment inspection of goods by the appointed Inspection Agents is mandatory for all imports except those below U.S \$5,000 (C & F value) and others specifically exempt from pre-shipment inspection under the Provisions of the Comprehensive Import Supervision Scheme (CISS) Decree of 1978 and its amendments. It has come to my attention that the above requirement has been breached by some Government Departments for reasons which cannot be said to be in the best interest of the country. Accordingly, notice is hereby served that the mandatory requirement of pre-shipment inspection of imports will be strictly enforced.

4. You are kindly requested to make your best endeavours to ensure that that the contents of this circular are brought to the attention of all concerned and that the laid-down procedures are strictly followed.

(Sgd.)

CHU. S. P. OKONGWU
Minister of Finance and Economic Development.

4. LAIP説明ノート

**ANAMBRA-IMO RIVER BASIN
DEVELOPMENT AUTHORITY**

EXPLANATORY NOTE

ON

LOWER ANAMBRA IRRIGATION PROJECT

JUNE, 1988

**NIPPON KOEI CO., LTD.
CONSULTING ENGINEERS**

BRIEF ON LOWER ANAMBRA IRRIGATION PROJECT

1. LOCATION:	Omor in Uzo-Uwani L.G.A., about 55km west of Enugu	
2. PROJECT SCOPE:	Construction of irrigation facilities for a net area of about 3,850ha for double cropping of rice per year with mechanized cultivation. Installation of Rice Mill Complex and Mechanical Workshop.	
3. CONTRACTOR:	TAISEI - C. ITOH CONSORTIUM	
4. SUPERVISING ENGINEER:	NIPPON KOEI CO., LTD	
5. CONTRACT DURATION:	Main Civil Works: 5 years (Oct. '81-Feb. '87) Rice Mill Complex: 1.5 Years (May '87-Oct '88)	
6. MAIN CONTRACT COST:	<u>Contract Sum</u>	<u>Progress</u>
Civil Works	N33.1 Million	33.3 Million
Pumping Station	3.6 Million	3.6 Million
Agricultural Equipment	2.6 Million	2.6 Million
Physical Contingency	3.0 Million	0.3 Million
Total	N42.3 Million	39.8 Million

Additional works (Yen = 2,705 million and Naira = 2.5 million)

ACHIEVEMENT TO DATE

Achievement (End Dec. '87)

- Total Project	3,850 ha
- Pumping Station	5 units (one standby)
- Headrace Canal	16.5 km
- Area Cleared	3,971 ha
- Area Developed (for Rice)	3,800 ha
- Area Developed (for other crops)	400 ha
- Roads	400 km
- Irrigation Canal	357 km
- Drainage Canal	234 km
- Structure Construction	6,460 nos.

Additional Works

Mechanical workshop (workshop, water supply)	80% progress
Rice Mill Complex (3.3 ton/hr)	80% progress
O/M Equipment	Procured

Cost

Milling of paddy rice mill commence from October 1988.

PRODUCTION STATUS:

(1) Performance of Rice Production:

<u>Year</u>	<u>Season</u>	<u>Area Operated</u>	<u>No. of Farmers</u>	<u>Average Yield</u>
1) 1982	Rainy Season	385 ha	350	1 ton/ha
2) 1983	Rainy Season	1,600 ha	1,500	1.2
3) 1984	Rainy Season	2,600 ha	1,740	2.5
4)	Dry Season	35 ha	-	3.0
5) 1985	Rainy Season	2,000 ha	1,800	2.8
6)	Dry Season	560 ha	600	3.0
7) 1986	Rainy Season	2,700 ha	2,850	2.8
8)	Dry Season	1,300 ha	1,650	3.0
9) 1987	Rainy Season	2,800 ha	3,000	2.8
10)	Dry Season	480 ha	500	3.0
11) 1988	Rainy Season	3,300 ha	4,500	3.0(expected)

(2) At Full Development:

- (a) Area to be cropped to rice..... 3,850 ha (2crops/yr.)
- (b) No. of farmers to be involved..... Over 3,000
- (c) Expected yield of rice..... Over 30,000 tonnes paddy per annum
- (d) Area developed for other crops..... 350 ha.

PROBLEMS:

- (a) Cow menace (destruction of canals and rice in fields)
- (b) Farmers organization
- (c) Disruption of structures by villagers (farmers)

1. GENERAL DESCRIPTION OF THE PROJECT

1.1 Back Ground and Present Situation

A study of the overall development plan for the Do-Anambra River area, covering about 100,000 ha, commenced in March 1973 by the Consultant, Nippon Koei Co., Ltd. The feasibility study was conducted in 1974 by the same Consultant in the Do-Anambra River Area. The feasibility Report concluded that the Lower Anambra Irrigation Project covering 5,000 ha of irrigated land has enormous potentialities for agricultural development which would largely contribute to increased production of food crops, particularly rice production (about 50,000 tons annually) and will also elevate the living standard of the people in the areas. It will in addition contribute greatly to foreign exchange reserve for Nigeria. The Report also concluded that this project is technically sound and financially feasible and most promising project when compared with other areas.

The detailed design was prepared by the same Consultant in 1977. The Anambra/Imo River Basin Development Authority has taken initiative for the implementation of the project since 1978. The civil construction works was commenced in September, 1981 by:

Executing Agency: *(W.P.L.)* Anambra/Imo River Basin Development Authority
Consultant (Engineer): Nippon Koei Co., Ltd.
Contractor: Taisei - C. Itoh Consortium
Funding: (1) Nigeria, FMF
(2) Japan, OECF (Overseas Economic Cooperation Fund) Government.

All irrigation facilities including road net works covering net area of 3,850 ha are constructed/completed by February 1987. All facilities are now fully operational for both the rainy season and dry season rice cultivation. At present, however, the construction of the following additional works are in progress

- (1) Rice Mill Complex (3.3 ton/hr)
- (2) Mechanical Workshop at Omor including Water supply System

The procurement of O/M Equipment is also underway. The rice mill complex will start operation from September 1988.

Cropping of rice started in 1983. In fact, about 2,700 ha of rainy season rice was cultivated in 1986 by 2,850 farmers who participated. At present, the 1987 rainy season rice cropping is in progress covering some 2,700 ha and involving about 4,000 farmers. The irrigation water is fully supplied to the rice farm between November and December, 1987. The cultivation area has been expanding year by year and a target of 3,850 ha will be achieved at the 1988 rainy season rice cultivation. More than 10,000 farmers show willingness of the involvement of the rice cultivation programme. The participating farmers have benefited from higher productivity due to the use of modern technology and irrigation.

(N)

should be
revised

1.2 Location, Climate, Water Resources, Etc.

The Lower Anambra Irrigation Project area is located in Uzo-Uwani L.G.A., about 55 km west of Enugu, the Capital of Anambra State, (see Location Map). The area extends on a gently undulating topography with an average land slope of 1:300 over the area of more than 5,000 ha.

The climate is characterized by two distinct seasons (rainy and dry), and it is possible to undertake double cropping of rice by application of irrigation water. For the rainy season rice, supplemental irrigation is essential for high yield of rice. The soil in the project area is generally silty to loamy clay, and it is favourable for rice cultivation.

The ^(N)Water source for this project is the Anambra River at Ifite Ogwari, at which a drought discharge of more than 39 cumecs is available. The peak water required for the project is estimated at 8 cumecs. The existing water source therefore is more than sufficient to meet this water requirement. The irrigation water will be lifted to about 39m at the Ifite Ogwari Pumping Station already constructed, and the water will be distributed to the paddy fields by gravity through main, secondary, tertiary and distribution canals.

There are six villages in and around the project area namely Omor, Umumbo, Umelum, Anaku, Ifite-Ogwari and Igbakwu, practically all the inhabitants are engaged in farming.

1.3 Purpose and Project Advantage

This agricultural development is vitally important, particularly for the solution of the increasing population pressure in Nigeria as a

whole. At present, the population is growing at a high rate of more than 2.5% per year. It is also desired to secure foreign exchange reserve by decreasing food importation. Such being the situation, increase of food production through agricultural development was earnestly desired in the National Development Plan.

For the development of the Lower Anambra Irrigation Project (5,000 ha), the following basic concepts are conceived:

- 1) Expansion of new farm land by providing irrigation system and transportation network.
- 2) Formulation of optimum cropping under irrigated condition with a view to increasing land productivity (Double cropping of rice is adopted)
- 3) Introduction of improved farming techniques for high crop production (intensive training programme)
- 4) Establishment of farm management and farmers' organization.

This irrigation project will act, not only to increase food production but, also as a showpiece of rice cultivation in Nigeria. In fact, farmers around the project areas have also been expanding their rice cropping areas under the influence of this irrigation project. Moreover, the living and education conditions are much improved compared with those of 1981 at the commencement of the project.

The project advantages before and after the project implementation are summarized in the following table.

ADVANTAGES OF THE PROJECT

<u>Description</u>	<u>Before Project(1981)</u>	<u>After Completion(1988)</u>
1. Land	Grass land, bush/ forest land	Crop production centre
2. Food Production	Low (500 tons/year)	Very high production (35,000 tons/year)
3. Farming Techno.	Low	High, it will be expanding to the surrounding area
4. Development of Area.	Low	Rice cropping area is expanding year by year around the project area
5. Foreign Exchange Reserve(F.E.R)	Spent large amount F.E.R)	Large amount be saved

<u>Description</u>	<u>Before Project(1981)</u>	<u>After Completion(1988)</u>
6. Education and Communi. System	Poor	Education opportunities are extending
7. Living Standard	Low	High
8. Land conservation	Low	Better for paddy field
9. Farmers Organi- zation	Nil	Formulation of farmers organization is underway.

2. CONSTRUCTION WORKS

2.1 Project Facility and Progress of Construction Works

The major construction works consist of the pumping station at the Anambra river, Headrace canal, irrigation and drainage canals, road networks and numerous structures, and development of 3,850 ha in the project area. The main feature of the project is summarized in the table below. The details are shown in table ~~2~~ ¹ *started in Table 1*

The construction work commenced since September, 1981. All construction works such as the pumping station, headrace canal and large volume of canals and roads are already completed. The achievement of the construction works are shown in the table below.

<u>Description</u>	<u>Achievement</u>
1) Pumping Station	5 units with one standby
2) Irrigation Canal	
1 - Headrace canal	16.5 km
2 - Main canal	23.6 km
102-Secondary/Tertiary canals	64 km
784-Distribution canal	270 km
3) Drainage Canal	
60-Main & collector drain	33 km
635-Field drain	189 km
4) Road Network	
45-Trunk & sec. road	93 km
789-Farm road	285 km
5) Structures	
Turnout, Culverts, etc.	417 nos.
Division box	2,891 nos.
6) Land Development	
Bush & forest clearing	3,990 ha
Land levelling	3,850 ha

2.2 Project Cost and Construction Period

1) Project Cost

The project work comprises civil engineering works covering land development of 3,850 ha, construction of pumping station, supply of agricultural equipment and the contingency.

The total cost of this programme amounted to about 42.3 million Naira out of which more than 70 percent is paid by Japanese Yen through the OECF loan. Besides, price escalation cost is allocated. The progress payment on the civil construction works made to the Contractor as at the end of December, 1987 is summarized as follows:

<u>Original Contract</u>	<u>Schedule</u> (N x 1,000)	<u>Progress</u> (N x 1,000)
I. <u>Civil Engineering Works</u>	<u>33,125</u>	<u>33,277 (100%)</u>
1) General Items	3,537	3,544 (100%)
2) Pumping Station Civil Works	3,457	3,809 (110%)
3) Canal and Road Earthworks	10,009	10,662 (104%)
4) Canal and Road Structures	6,877	5,116 (74%)
5) Land Preparation	9,245	10,205 (110%)
II. <u>Pump Equipment</u>	<u>3,559</u>	<u>3,559 (100%)</u>
III <u>Agricultural Equipment</u>	<u>2,600</u>	<u>2,600 (100%)</u>
IV. <u>Contingency</u>	<u>3,062</u>	<u>330 (11%)</u>
<u>Total</u>	<u>42,345</u>	<u>39,766 (94%)</u>

should be updated

Besides above, the following additional works are introduced:

<u>Additional Works</u>	<u>Yen</u> (million)	<u>Naira</u> (thousand)
A. Rice Mill Complex	2,290	2,310
B. Mechanical Workshop	130	161
C. O/M Equipment	285	60
<u>Total</u>	<u>2,705</u>	<u>2,531</u>

The construction of above additional works are in full swing. Operation of rice mill plant is expected from September, 1988.

2) Construction Period

The original construction period of this contract was to span 5 years from September 1981 to February 1987. All civil construction works (3,850 ha) were completed by February 1987. Three additional works are newly introduced. The construction period of these additional works is 18 months from May 1987 to October 1988. The construction of rice mill complex and mechanical workshop is in full swing and it is expected that all construction works will be completed by October 1988.

3. FARM OPERATION

3.1 Rice Production Programme

The objectives of agricultural development in the Lower Anambra Irrigation Project is (1) to demonstrate advanced techniques of rice cultivation with irrigation, (2) to increase crop production so as to contribute to the national food stabilization programme, (3) to produce high quality of milled rice and to reduce losses and (4) to reinforce the socio-economic situation of the rural areas through agricultural modernization.

Rice has been selected as the primary crop in the project area and it is expected to produce about 50,000 tons of paddy rice annually by applying double cropping a year, i.e. the rainy and dry season paddy. The rainy season rice is generally cultivated from June to October by utilizing rain-water to a maximum extent, while the dry season rice is grown from November to April under full irrigated conditions.

For rice cultivation, the farmer participation programme has been prepared to comply with the operation and management conditions of advanced rice cultivation techniques. Besides, farmer participants will organize themselves into water users associations, a form of farmers' cooperative society, in the implementation of this programme. Under the technical guidance and supervision of the Authority, members of the association should engage in:

- Operation and maintenance of irrigation-cum-drainage facilities at on-farm level.

- Operation and management of rice cultivation, season by season, according to the rice production programme prepared by the Authority.

3.2. Performance of Rice Cultivation

The rice production programme has been implemented since 1982. The actual progress of rice cultivation is summarized as follows:

<u>Year</u>	<u>Season</u>	<u>Area Operated</u>	<u>No. of Farmers</u>	<u>Average Yield</u>
1) 1982	Rainy Season	385 ha	350	1 ton/ha
2) 1983	Rainy Season	1,600 ha	1,500	1.2
3) 1984	Rainy Season	2,600 ha	1,740	2.5
4)	Dry Season	35 ha	-	3.0
5) 1985	Rainy Season	2,000 ha	1,800	2.8
6)	Dry Season	560 ha	600	3.0
7) 1986	Rainy Season	2,700 ha	2,850	2.8
8)	Dry Season	1,300 ha	1,650	3.0
9) 1987	Rainy Season	2,700 ha	3,000	2.8
10)	Dry Season	480 ha	400	3.0

The low rice yields in the first two years were due to the drought problems which occurred during the rain-fed cultivation. The production from current operation shows a better yield, and the highest unit production of over 5 tons/ha/crop season was achieved during the last rainy season rice cropping.

In parallel with the rice production programme stated above, the Authority has operated the seed multiplication-cum-technical demonstration programme. Through this practical operation, it is expected that project staff and many farmers will be trained in advanced technology on rice farming with irrigation.

The rice varieties so far used for the production programme are: IR-14/16, BG-90-2, ITA-212, ITA-222 and ITA-306.

Technical cooperation is continued with IITA, Ibadan for rice research, and seed multiplication

3.3 Agricultural Equipment

For land preparation works, a large number of tractors, together with their attachments, will be introduced. The major agricultural equipment introduced to this project are as follows.

<u>Item</u>	<u>Nos.</u>
1. Tractor	136 nos.
2. Knapsack type sprayers	102 nos.
3. Trailers	34 nos.
4. Maintenance truck	4 nos.
5. Attachment, equipment and spare parts	1 lot

A Threshing machine

The operation of the agricultural equipment has commenced since February 1987. At present, the tractors and other agricultural equipment are fully operational for land preparation works for the ¹⁹⁸⁸ coming dry season rice cultivation.

3.4 O/M Equipment

For operation and maintenance of the project facilities, the following O/M equipment will be introduced.

<u>O&M Equipment</u>	<u>Nos.</u>
1. Backhoe	1
2. Bulldozer	2
3. Motor Grader	2
4. Dump Truck	5
5. Other Equipment	4
6. Thresher	60
7. Spare Parts & Tools	L.S

4. RICE MILL OPERATION

A new rice mill complex (3.3 ton/hr) is under construction near Bifurcation site (see location map). This rice mill complex will be completed by September 1988 and thus milling of rice including parboiling will start accordingly.

Three silos
Storage silo of 3,000 tons

It is hoped this rice mill will process a good quality of rice of more than 15,000 tons per year. 3,000-ton silos will be constructed in this complex in order to maintain high efficiency of milling process as well as to keep good quality of paddy rice during the storage period.

The rice mill complex will consist of :

- 1) Receiving/drying (12 ton/hr)
- 2) Storage silo (1,000 tons x 3 unit)
- 3) Parboiling (3.3 ton/hr), and
- 4) Milling (3.3 ton/hr).

This rice mill will operate two times a year, rainy season and dry season rice, each operating period of about 4 - 5 months. Since this rice mill plant can process rice of about 15,000 tons per year, it is necessary to expand the capacity of the rice mill plant in future in order to cope with increasing production of rice for not only this project area but also surrounding rice farms which are rapidly expanding.

Table 1 PRINCIPAL FEATURES OF CIVIL ENGINEERING WORKS

1. PUMPING STATION

The pumping equipment which consists of pumps with engines, outlet valves and check valves will be operated from the control board installed in the control room. The principal features of the pumps and engines are summarized as follows:

(i) Pumps and engines

No. of unit:	5 units (including one standby)
Type of pump:	Mixed flow pump, direct coupling with engine
Type of engine:	1,400ps each, diesel engine
Pump capacity:	2 cumec each
Total head:	31.0m (actual head)
Suction(delivery),WEL:	EL. 19.4m (EL. 50.4m)
Outlet and check valve:	5 sets each
Fuel (Oil) tank:	2 (1) set

(ii) Pump house

Structure:	1 story and 1 basement for pump room
Dimension (WxLxH)	Pump room, 17m x 32m x 22m

(iii) Discharge pipeline: Length (120m) and Diameter (1.8m)

2. IRRIGATION CANAL

	<u>Nos.</u>	<u>Total Length(km)</u>
Headrace	1 no.	16.5
Main Canal	2 nos.	23.6
Secondary Canals		12.0
Tertiary Canals		52.0
Distribution Canal		269.2

(i) Headrace

Command irrigation area:	5,000 ha
Design discharge:	8.0 cumec (velocity:0.6m/s)
Canal size:	unlined trapezoidal section
Canal width (height):	4.0 m (2.6 m)
Total length:	16.5 km
Gradient of the canal:	1 to 4,500

(ii) Main Canal

<u>Description</u>	<u>West Main canal</u>	<u>East main Canal</u>
Command irrigation area(ha)	2,166	1,684
Design discharge(cumec)	4.5 - 1.1	3.5 - 0.6
Total length (m)	11,765	11,820

3. DRAINAGE CANALS

	<u>Total Length(km)</u>
Collector drain	39.6
Field drain	194.8

4. ROAD NETWORK

(i) Principal features of road network

	<u>Total Length(km)</u>	<u>Total Width</u>	<u>Pavement by Laterite (width)</u>
Trunk Road	2 nos 12.7	10 m	8 m (15cm)
Secondary Road	43 nos 96.0	7 m	5.5 m(15cm)
Farm Road	291.3	5 m	4.0 m(10cm)

5. CANAL AND ROAD STRUCTURE (NOS.)

<u>Name of Structure</u>	<u>Nos.</u>
Bifurcation	1
Turnout	70
Culvert	117
Cross drain	255
Drop	46
Cross regulator	8
Spillway	17
Division box	3,232
Farm approach	2,715
Foot path, etc	10
<u>Total</u>	<u>6,471</u>

6. LAND PREPARATION WORK

(i) Land Clearing: Forest area and bush area (ha)

(ii) Land Levelling work (3,850 ha)

NW zone:	1,020	NE zone:	1,015 ha
SW zone:	1,146	SE zone:	669 ha