2-4 Infrastructure

The settlers moving into the Project Area will need to be afforded appropriate livelihood environment provided with the standard public facilities such as a road network, potable water supply and electrification, public health, school, mosque, public hall, market, police, workshop, etc.

(1) Public Facilities

The rural community of the Project Area will consist of a certain number of satellite villages and service villages, three central villages and one town. The outline of the public facilities is as follows:

Satellite village is a basic unit in the Project Area to support a range of social services. Therefore the satellite village will be immigrated by about 250 farm households, and have daily necessities for living such as potable water, electric power, sewage treatment and market, etc. Moreover, in order to give technical guidance to settlers in farm management, an agricultural administration office will be established, requiring accomodation for the office staff and technical officials.

Service village shall be responsible for the administrative aspect of the surrounding satellite vilalges, three to four in number. Therefore a village development office will be necessary for the service village in addition to the above-mentioned agricultural administration office. Furthermore, education facilities such as combined primary and preparatory schools will be necessary in service villages. A medical clinic to keep villagers in good health condition and to give first aid, a market and stores for daily necessities and miscellaneous goods, workshop to repair simple farm machines and vehicles, etc., and a rice mill to process paddy for self-consumption of farmers will be installed in the service village in addition to the above-mentioned facilities.

The central villages will be provided with similar facilities to those of service villages. However, the scale of them shall be larger than those of service villages. For instace, a hospital will be necessary in place of medical units.

A secondary school shall be maintained in the central village for higher education. The main post office shall be installed in each central village for controlling post offices in service villages. Furthermore, facilities for veterianry services and breeding of domestic animals will be installed there.

The town having functions for administration of "the greater area" will be planned at the crossing of El Salam Canal and Bahr El Baqar. The town serves for wider in area and is higher in level than the central villages. For education, a college shall be maintained in the town for higher education. A purification plant for water supply and substation of electric power will be constrcucted in the town and utilized for the people living in "the greater area".

It is noted that a village area will be divided into three zones of a service zone, a farmers house zone and the owner's house zone. This zoning is commonly made by GARPAD. Fig.M-2-4 illustrates the layout of typical village zoning.

A typical satellite, service and central village and town will contain the following facilities;

- Education:
  A combined school will be open in each service village and central village. In a central village, a secondary high school and a nursery school will be built, and a college will be established in a town.

- Health:
  A medical clinic will be built to keep settlers healthy in each service and cental village. Central village will be provided with a hospital with about 20 beds. Town will have a larger hospital.

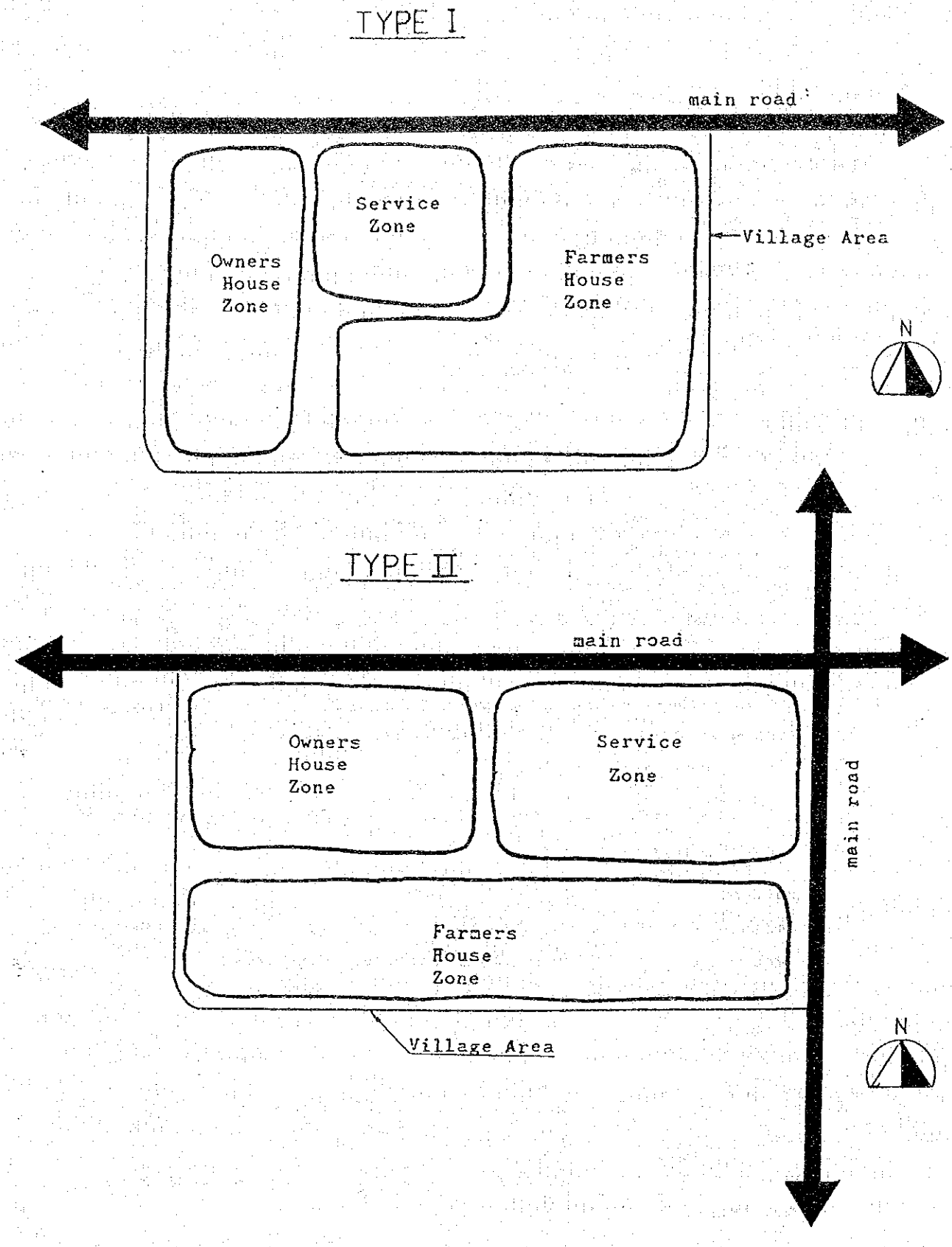


Fig. M-2-4 Typical Zoning of Village

- Agricultural and Irrigation Services:

  Agriculture Extension Service office, operation and management office for irrigation and drainage canal system and administration office will be built in each all kind villages. An auto service station and storage house will be provided in each service, central village and town.

- Commercial:

  In satellite villages small stores will be built to supply daily goods for villagers such as bakers, grocers, and general stores, etc. More space will be necessary for those in town, central and service villages to reflect the high level commercial activities there.

- Mosque:

  A mosque is usually provided by the Government. It has been allocated in each village, a small mosque without tower in satellite village and a large mosque with tower in service, central villages and town. Land for cemeteries has also been allotted near villages.

- Access:

  Villages will be linked with each other by paved roads. Street in villages will have an effective width of 10 m. The street will be provided with a footpath of 3 m wide at both sides. The main streets in villages will be paved.

- Utilities:

  Potable water and electric power will be supplied to all houses in the villages. In addition, some communal standpipes with hydrant space for washing will be attached so that no villagers have to use irrigation water for drinking or other domestic purposes. Telephone services will be made available by connecting to the town exchange board.

- Others:

The principal social service facilities such as police station, fire station, post office, bank, telephone office, etc. will be established in the central village and the town.

Table M-2-2 Facilities and Population of Satellite Village

Buildings	Building Area	Number of Buildings	Number of Families	Population
Agri. adminstrative Office	500 sq. m	1	15	75
Group of Shops	300	1	20	100
Mosque	100	1	3	15
Technical Laborers House	58	8	8	40
Apartment	300	2	-	-
Owners House	60	33	33	165
Farmers House	54	260	260	1,300
Total			339	1,695

Table M-2-3 Facilities and Population of Service Village

Buildings	Building Area	Number of Buildings	Number of Families	Population
Village Development Office	75 sq.m	1	20	100
Combined School	1,600	1	18	90
Medical Clinic	212	1	5	25
Mosque	181	1	3	15
Auto Service Station	180	1	10	50
Market with Bakery	717	1	15	75
Directors House	200	1	2	10
Ass't Directors House	153	1	2	10
Technical Laborers House	58	20	20	100
Apartment	300	3	-	-
Owners House	60	30	30	150
Farmers House	54	230	230	1,150
Total			355	1,775

Table M-2-4 Facilities and Population of Central Village

Buildings	Building Area	Number of Buildings	Number of Families	Population
Village Development Office	800 sq.m	1	20	100
Administration Office	1,600	1	40	200
Artificial Insemination Center	1,025	1	12	60
Nursery School	500	2	20	100
Combined School	3,200	1	30	150
High School (General, Agriculture and Commerce)	3,200	1	30	150
Hospital (20 beds)	500	1	30	150
Medical Clinic	212	1	5	25
Mosque	181	2	6	30
Police Station	568	1	8	40
Post Office	170	1	15	75
Fire Station	230	1	6	30
Storage House	1,000	1	8	40
Village Bank (Incl. Insurance)	250	1	10	50
Workshop	1,000	1	20	100
Auto Service Station	180	1	10	50
Market with Bakery	717	2	30	150
Group of Shops	258	8	24	120
Separated Bakery	180	1	6	30
Rest House for Employees	1,200	1	6	30
Club	500	1	4	20
Cinema Movie Theater/Theater	710	1	10	50
Directors House	200	8	8	40
Ass't Directors	153	8	8	40
Technical Laborers House	58	60	60	300
Apartment	30	9	-	-
Owners House	60 sq.m	18	18	90
Farmers House	60	187	187	935
Total			631	3,155

(2) Road Network

The settlement scheme will have three categories of roads of the dimensions as follows:

Structure Criteria of Roads

Kind of road	Structure
Main roads	Pavement 6.0 m wide; shoulder 2.0 m and 5.0 m
Village roads	Pavement 4.0 m wide; shoulder 2.0 m and 5.0 m
Farm roads	Unpaved 7.0 m wide

The road networks shall be laid out along the irrigation and drainage canals because the village roads will function as operation and maintenance roads.

a) Main Road

The main road will be constructed mainly for transportation of daily goods, agricultural inputs and farm outputs. As the main distribution centers of these material and products will be located at Port Said, Ismailia and Matariya, main roads should be linked with the national highway bound for these cities.

The main road will run on the top of tidal dyke and Bahr El Baqar Drain's dyke. Roads to be constructed in the Project Area will be connected among the three central villages and town.

Main Roads hinterland is attached as shown in Table M-2-5.

The main roads will have an effective width of 6 m to allow two lane traffic of heavy farm machines or heavy trucks to pass. Furthermore, an additional width of 2 m and 5 m will be secured in their shoulders for pedestrians. The main roads should be paved with gravel at a width of 6 m, with both shoulders unpaved. Trees (Eucalyptus and/or Nilotica) will be planted in the shoulder of 2m width. The other wide shoulder will be used for operation and maintenance of canals and traffic of agricultural machinery.

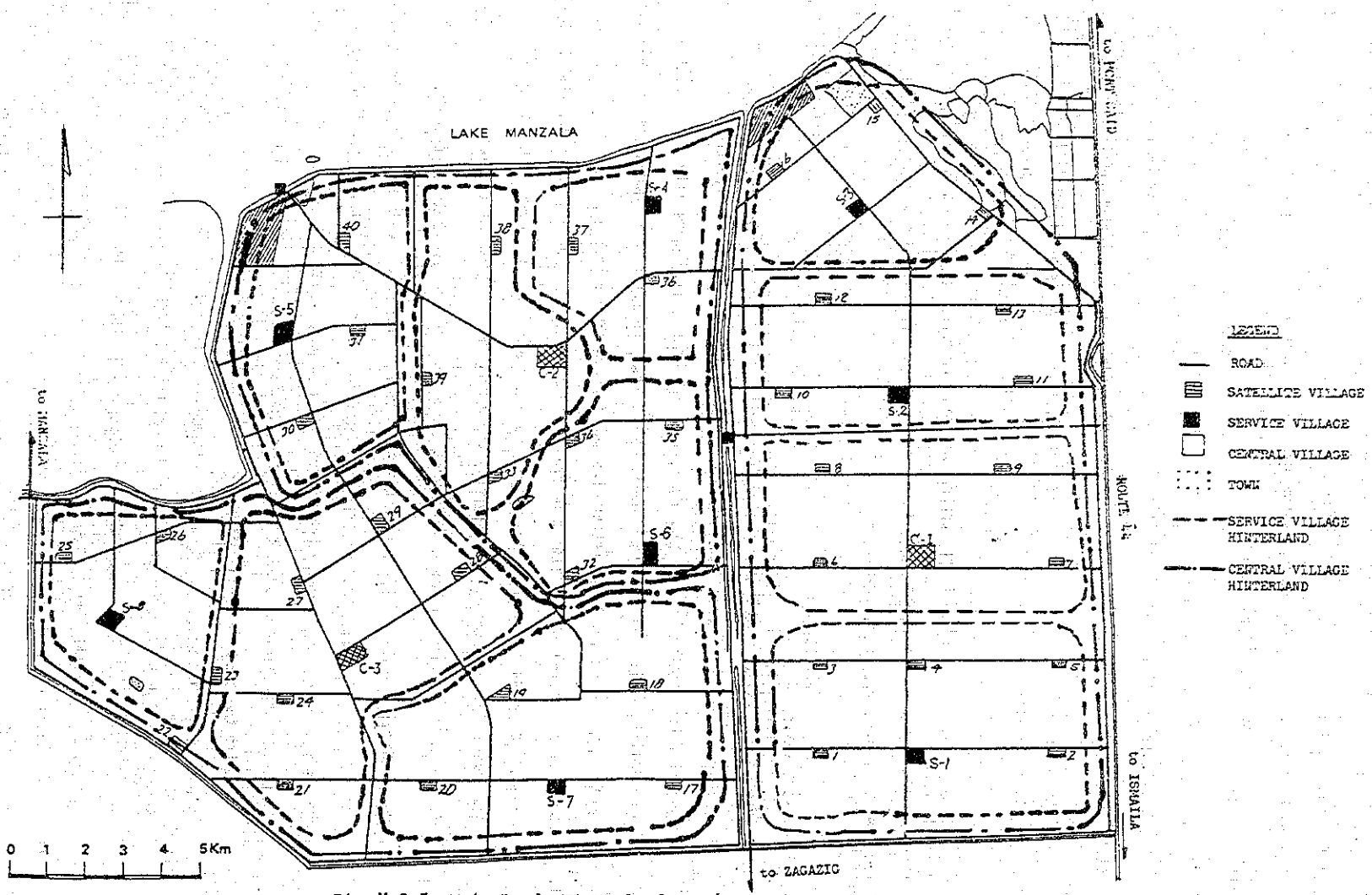


Fig. M-2-5 Main Roads Hinterland

b) Village Roads

The villages are connected with the main road by village roads. The effective width of the village road will be 4 m so that farm machinery such as tractors and trucks can pass. The road surface will be paved with gravel.

Village roads will be provided with a 2 m wide space at one side shoulder for tree planting and 5 m wide at another shoulder for operation and maintenance of the canals.

c) Farm Road

Farm roads will be distributed along the canals and drains. They will be non-paved and their total width is 7 m.

The length of each type of road is show in Table M-2-5.

Table M-2-5 Dimensions of Roads

Roads	Length	Width			Pavement
		Total	Vehicles	Pedestrian	
	(km)	(m)	(m)	(m)	
Main Roads	71	13.0	6.0	2.0 & 5.0	Gravel
Village Roads	342	11.0	4.0	2.0 & 5.0	- do -
Farm Roads		7.0	4.0	1.5	Unpaved
Total					

Road Density: 19 m/ha (8 m/Feddan)

(3) Water Supply

A water supply system including intake structure, water conveyance pipeline and purification plant will be provided to supply drinking water for villages.

With the difficulty in using groundwater and the El Salam Canal water for drinking water supply, fresh water of the Nile will be utilized as a source of drinking water. (See Fig. M-2-6)

One unit of water filtration facilities will be installed near the Town (North Hussinia Project Area) to meet the daily maximum water requirements of 50,000 m^3/day. The Purification plant will be connected with all villages by pipeline networks as shown in Fig. M-2-7.

a) Water Demand

It is generally accepted that the designed potable water requirement for rural development projects ranges in 100 to 200 liters per day per capita. In this plan the volume was determined at 150 liters per day per caita. In addition, the water requirement for cattle breeding was determined at 70 liter per day per head.

About 19,800 households are estimated to be settled in the Project area in the future. Assuming five members per household, the population in the Project Area is computed at 99,000 persons. In general, the drinking water supply plan shall be formulated in consideration of a future increase in the population. In this plan, the benefited population has been computed at 112,000 persons by the following formula:

$$Pw = (1 + a)^n Po$$

Where, Pw = Population in the year 2000

Po = Population in the year 1995

a = Increasing rate of population, 2.5%

n = Passage of time, 5 years

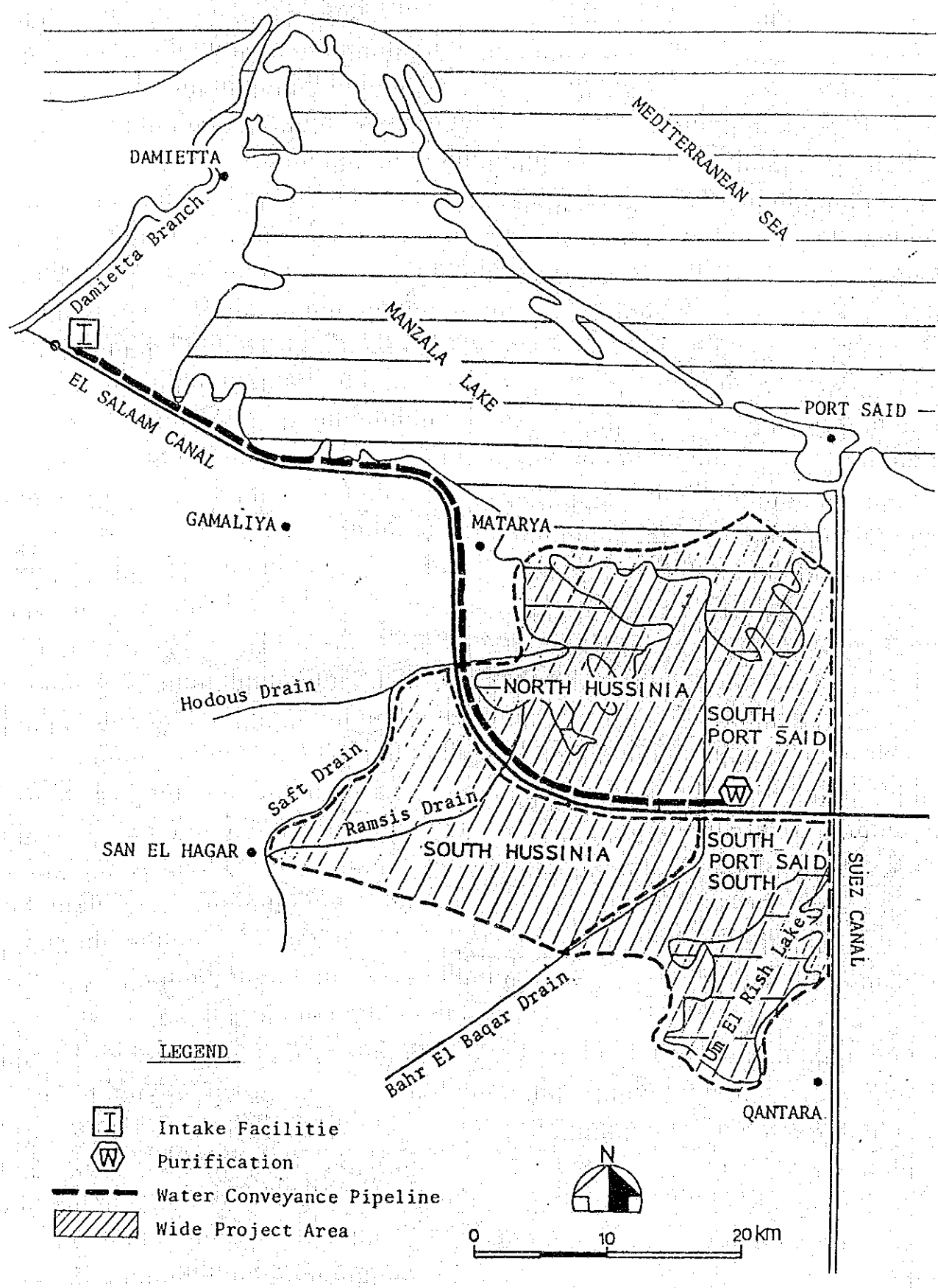


Fig. M-2-6 Water Supply Plan

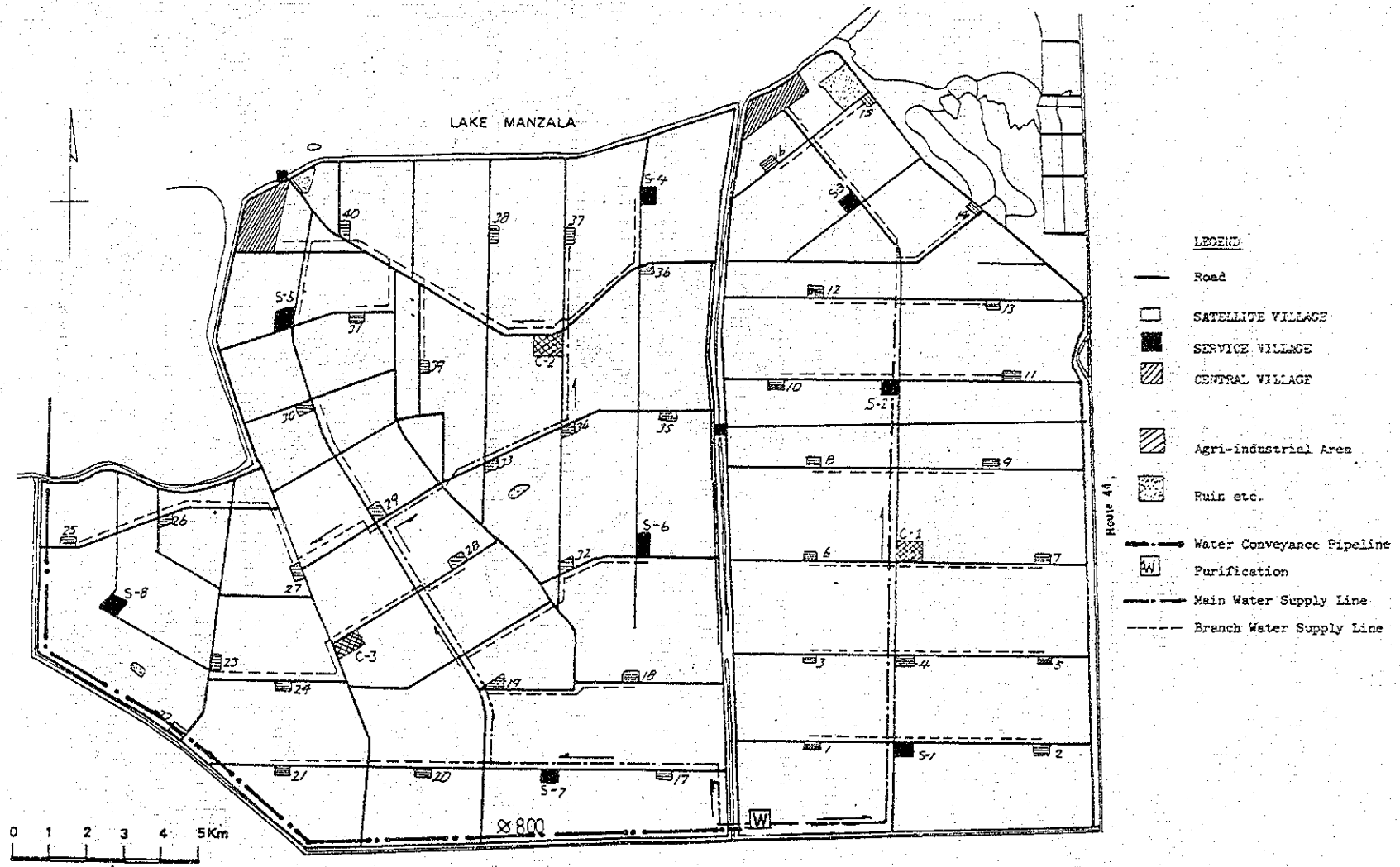
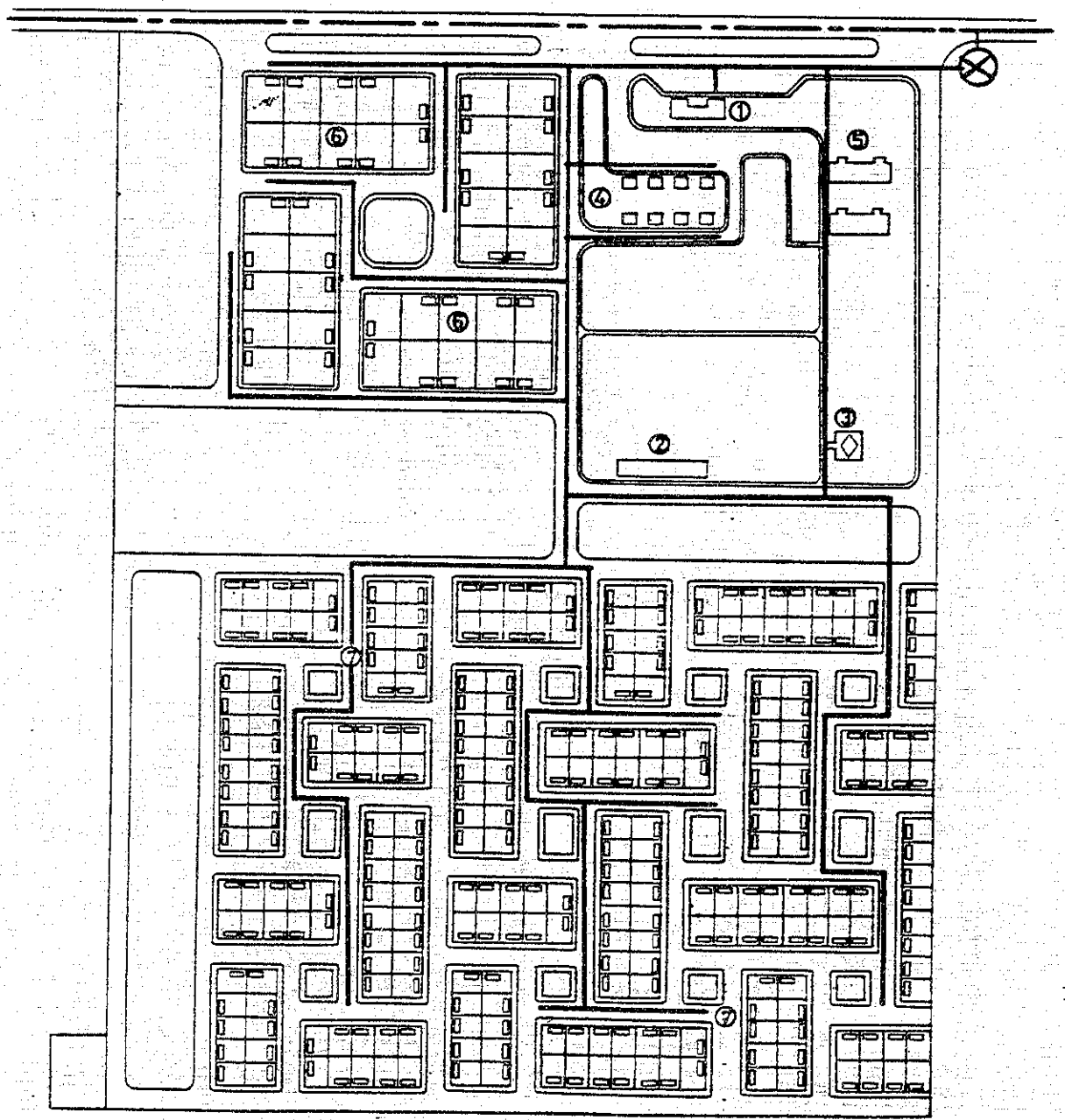


Fig. M-2-7 Water Pipeline Network



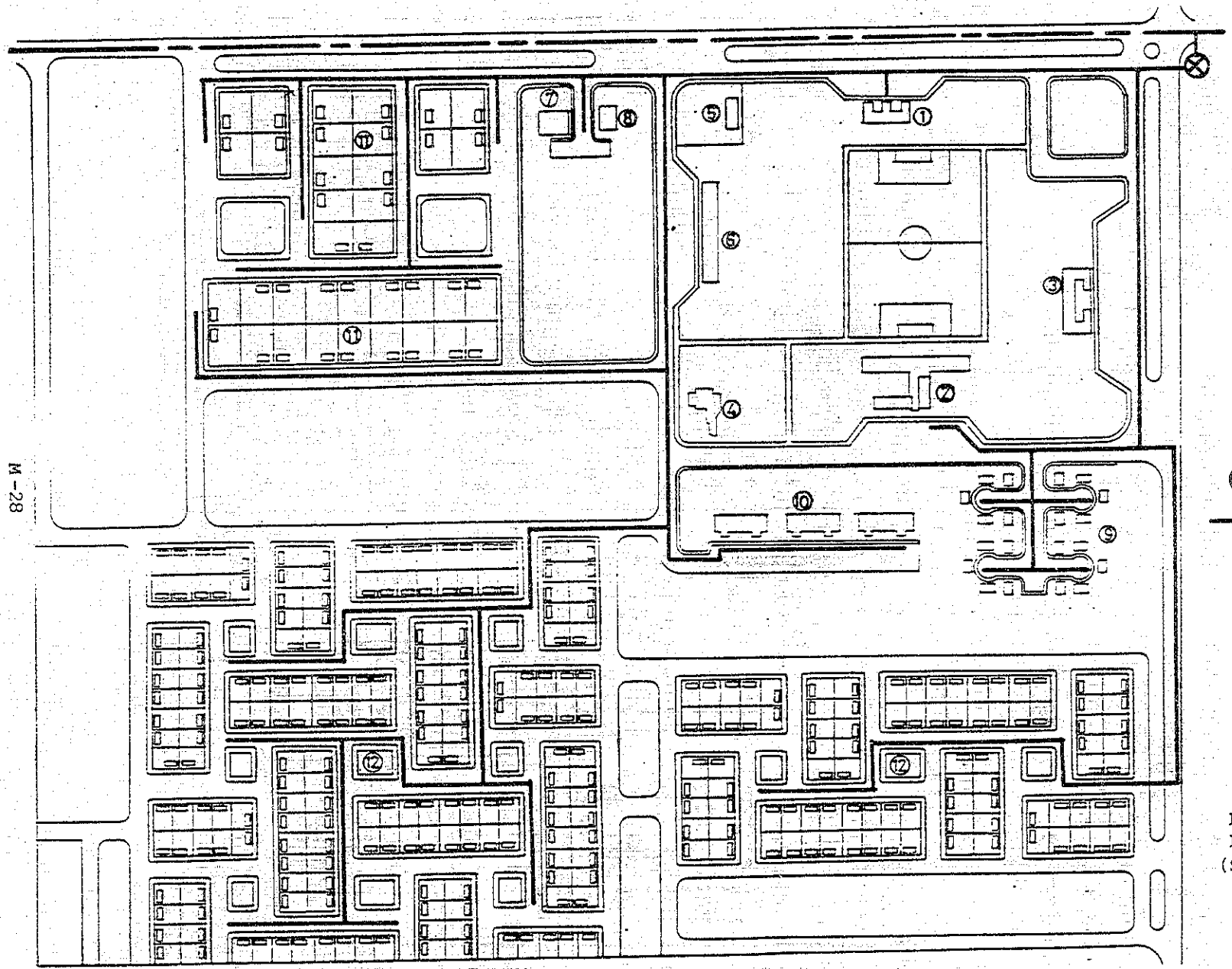
① AGRI. ADMINISTRATIVE OFFICE
② GROUP OF SHOPS
③ MOSQUE
④ TECHNICAL LABORERS HOUSE
⑤ APARTMENT
⑥ OWNERS' HOUSE
⑦ FARMERS' HOUSE

⊗ WATER TOWER

PIPELINE

0 50 100m

Fig. M-2-8
Pipeline of Potable Water
(Satellite Village)



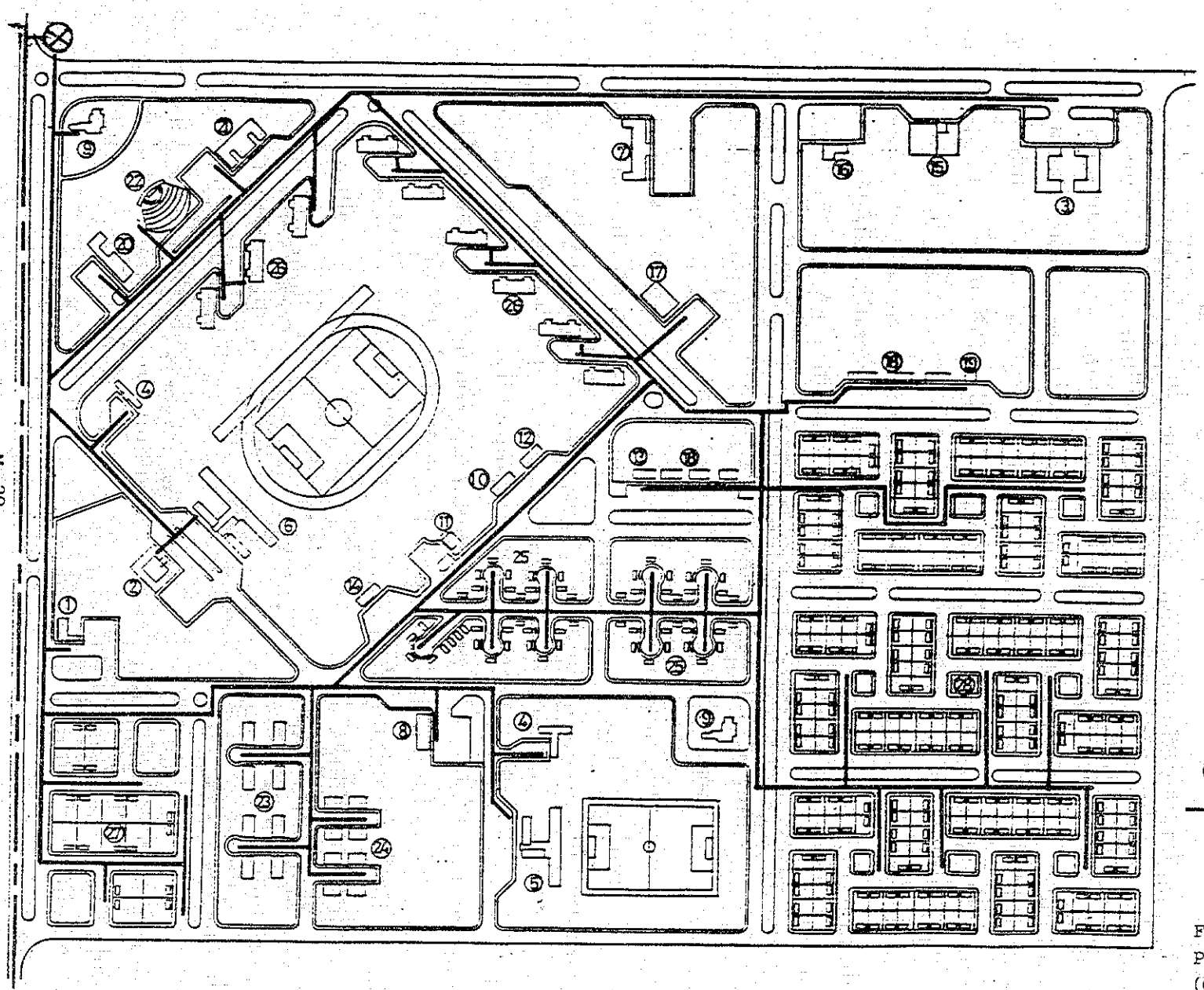
① VILLAGE DEVELOPMENT OFFICE
② COMBINED SCHOOL
③ MEDICAL TREATMENT UNIT
④ MOSQUE
⑤ AUTO SERVICE
⑥ MARKET WITH BAKERY
⑦ DIRETORS' HOUSE
⑧ ASS'T DIRECTORS' HOUSE
⑨ TECHNICAL LABORERS' HOUSE
⑩ APARTMENT
⑪ OWNERS' HOUSE
⑫ FARMERS' HOUSE

WATER TOWER

PIPELINE

0 50 100m

Fig. M-2-9
Pipeline of Potable Water
(Service Village)



1. VILLAGE DEVELOPMENT OFFICE
2. ADMINISTRATION OFFICE
3. ARTIFICIAL INSEMINATION CENTER
4. NURSERY SCHOOL
5. COMBINED SCHOOL
6. HIGH SCHOOL
7. HOSPITAL
8. MEDICAL TREATMENT UNIT
9. MOSQUE
10. POLICE STATION
11. POST OFFICE
12. FIRE STATION
13. STORE
14. VILLAGE BANK
15. WORKSHOP
16. AUTO SERVICE
17. MARKET WITH BAKERY
18. GROUP OF SHOPS
19. SEPARATED BAKERY
20. REST HOUSE FOR EMPLOYEES
21. CLUB
22. CINEMA/THEATRE HOUSE
23. DIRECTORS' HOUSE
24. ASS'T DIRECTORS' HOUSE
25. TECHNICAL LABORERS' HOUSE
26. APARTMENT
27. OWNERS' HOUSE
28. FARMERS' HOUSE

⊗ WATER TOWER

PIPELINE of POTABLE WATER

0 50 100m

Fig. M-2-10
Pipeline of Potable Water
(Central Village)

The mean daily water demand for the population and cattle is computed as follows:

150 liters x 112,000 persons = 16,800 m^3/day

70 liters x 91,800 head = 6,426 m^3/day

Total 23,226 m^3/day

(23,226 m^3/day/86,400 = 0.27 m^3/sec)

b) Water Supply Facilities

i) Intake and water conveyance facilities

Intake site for water supply will be located at the intake of El Salam Canal. A water conveyance pipeline will be constructed along the El Salam Canal from the intake site to the water purification plant planned at the crossing point of the El Salam Canal and the Bahr El Baqar Drain. The water conveyance pipeline will be about 70 km long and the diameter of pipe will be 800 mm.

Ductile pipe is preferable for the pipeline.

ii) Water purification plant

One water purification plant unit will be installed in the Town (North Hussinia Project Area) to meet the daily maximum water requirement of 50,000 cubic meters per day. Pumping facilities for water distribution will also be installed at the site.

c) Water Distribution Pipelines

The purification plant will be connected by pipelines with forty satellite villages, seven service villages, three central villages and one town in the Project Area. Water distribution pipes will be laid along the main and village roads. Booster pumps will be necessary to keep the water pressure in pipelines at an appropriate value.

The main pipeline will be about 47 km long in total, and branch pipeline about 118 km. Ductile pipe will be used for the pipeline. The diameter of pipes will vary from 200 to 400 mm for main pipes, and from 125 to 200 mm for branch lines. Facilities of water supply are shown in Table M-2-6.

Table M-2-6 Facilities of Water Supply

Intake Facilities	1 set
Purification and Pump Station	1 set
Water Conveyance Pipeline Ø800 m/m	70 km
Distribution of Pipeline	
- Main pipeline Ø400 m/m	12 km
Ø350 "	11 km
Ø300 "	16 km
Ø250 "	8 km
- Branch pipeline Ø200 m/m	18 km
Ø150 "	20 km
Ø125 "	80 km
Distribution Network for Villages	
- Satellite Village	40 units
- Service Village	8 units
- Central Village	3 units
- Town	1 unit

(4) Sewage system

All kind of villages are scattered over the Project Area and therefore it is preferable to estabish a sewage facility in each of them. In this community development plan, all houses except the farmers' houses will be provided with flush toilets. Sewage will be flushed through pipelines to a public sewage treatment tank. House wastewater will be treated same as sewage. Sewage from farmers' houses will be hauled by cart from their latrines to collecting points for tank treatment, and wastewater from communal taps will be gathered for treatment through drains. Facilities for garbage will be

installed separately from sewage treatment facilities. Trucks will be used to collect garbage. Garbage will be gathered at specified pits, and burned or buried and resolved in soils.

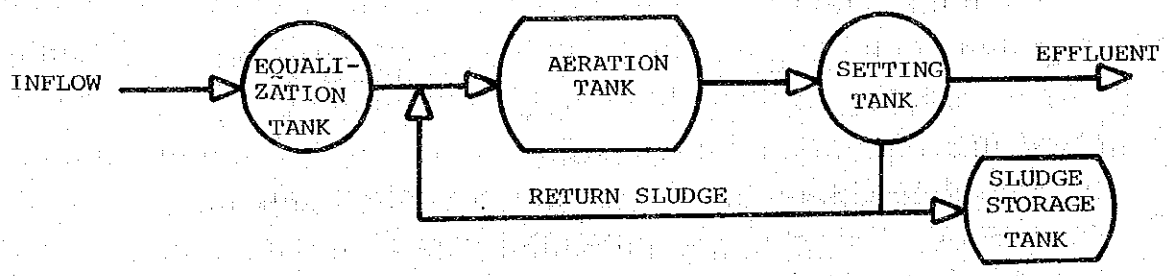
a) Wastewater Treatment Facilities

Today, in the world, there are many different treatment methods, Fig.M-2-11 illustrates methods of wastewater treatment.
But in these various treatment methods, four systems as shown in below have been generally used.

(1) Activated Sludge Process
(2) Rotary Disc Process
(3) Contact Aeration
(4) Oxidation Ditch

The outline of four treatment systems are as follows;

Activated Sludge Process ; The activity of aerobic bacteria is accelerated by blowing air into waste water and the supernatant separated through sedimentation in the settling tank is disinfected and released.



Removal ratio : 90 % or more
Amount of sludge produced ; 40% of B.O.D. removed
Maintenance and operation ; Must be attended by personnel
Power consumption ; Large
Sludge return ; Requires regulation
Recovery from accident ; More than a month

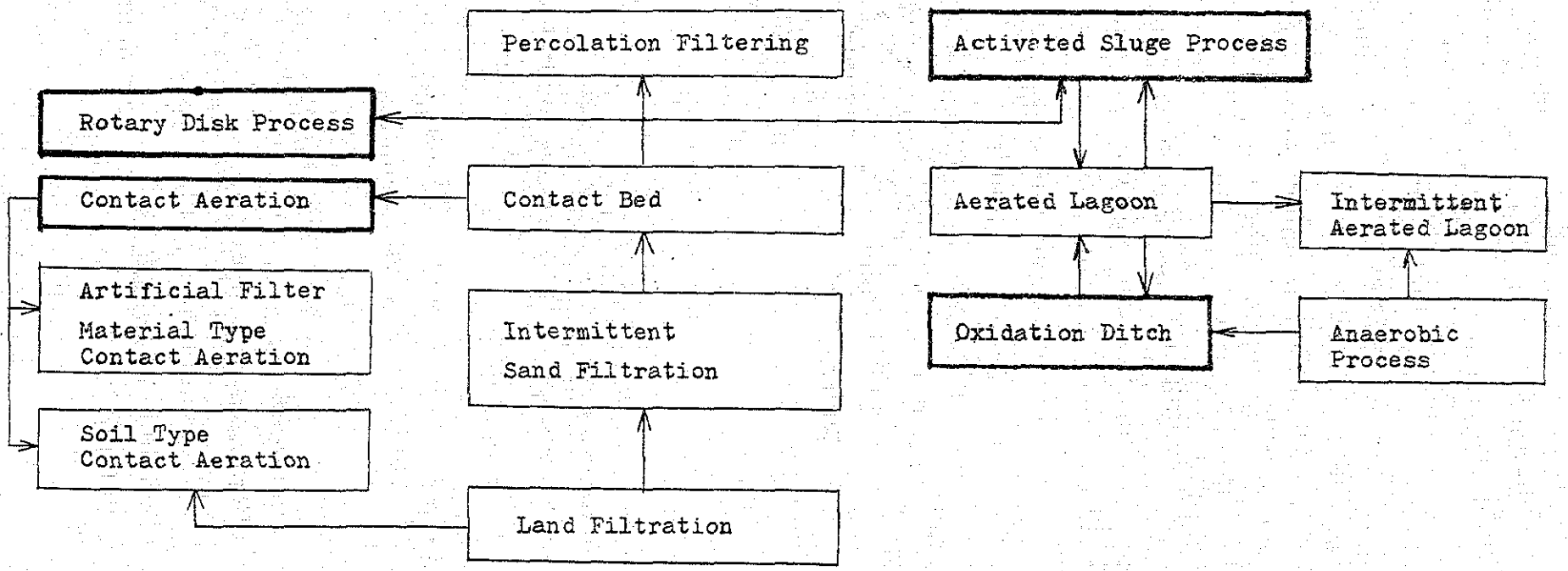


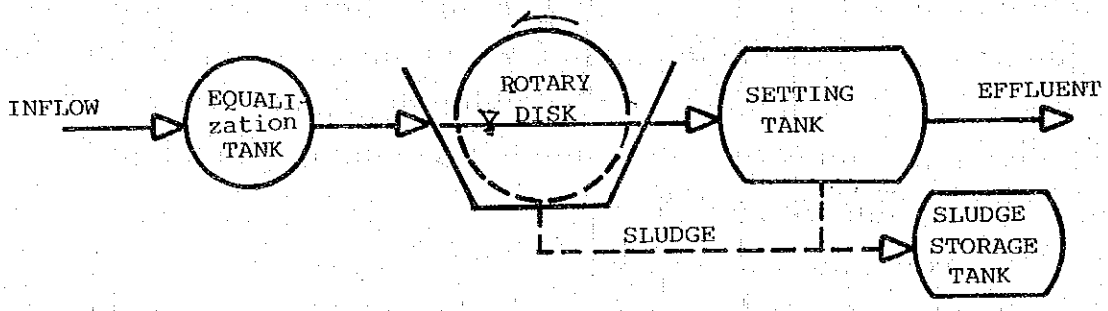
Fig. M-2-11 Methods of Biological Sewage Treatment

Load regulating capacity ; Ordinary

Plot of treatment works ; Small

Foul odor ; Occurs. Deodorizing apparatus is necessary

Rotary Disk Process ; A disk is dipped half into waste water having been separated through initial sedimentation. The water is subjected to both aerobic and anerobic treatment by turning the disk and, after being sedimentarily separated through final sedimentation, it is disinfected and released.



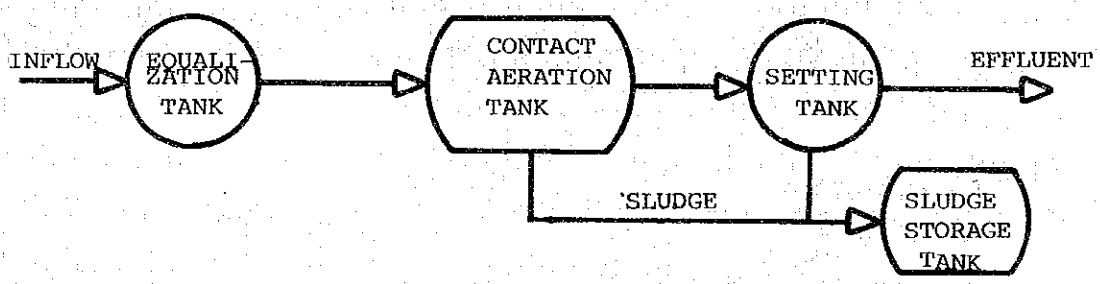
Removal ratio	; 90% or more
Amount of sludge produced	; 40% of B.O.D. removed
Maintenance and operation	; Inspection once a week or so
Power consumption	; Small
Sludge return	; None
Recovery from accident	; More than a week
Load regulating capacity	; Large
Foul odor	; Occurs
Noise	; None
Plot for treatment works	; Small
Nitrogen treating capacity	; Can be treated to an extent

Contact aeration system ; Diverse microorganisms are supplied into waste water and the contact filter bed by covering the entire treatment tank with soil or artificial filter material. High treatment can be easily performed and deodorization and the decrease of sludge are possible.

JARUS is "The Japanese Association of Rural Sewerage".

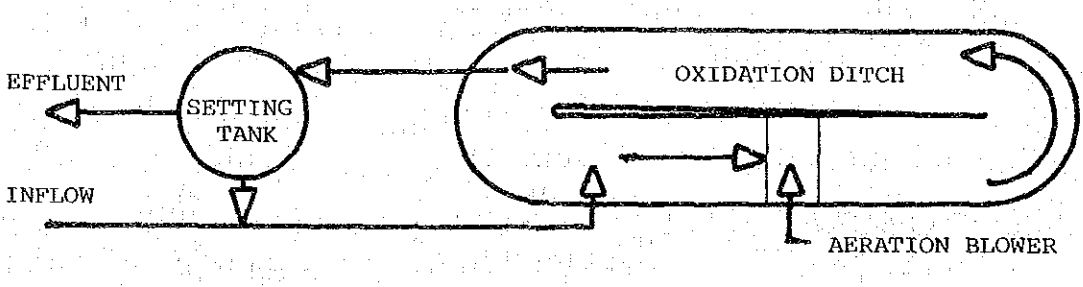
JARUS - It was developed for rural villages.

This system is a compact one and can be easily performed for higher treatment.



Removal ratio	;	95 % or more
Amount of sludge produced	;	30 % or more
Maintenance and operation	;	Inspection once a month
Power consumption	;	Small
Sludge return	;	None
Recovery from accident	;	2 or 3 days
Load regulating capacity	;	Large
Foul odor	;	None
Occurrence of mosquitos and flies	;	None
Scattering of bubbles and waste water	;	None
Noise	;	None
Nitrogen treating capacity	;	
Plot for treatment works	;	Ordinary

Oxidation Ditch System ; Waste water is circulated in the linked ditch with aeration. The water is subjected to both aerobic and anerobic treatment by circulating the ditch. This system is simple one, and maintenance and operation can be easily performed, but large lot is necessary.



Removal ratio	;	90 % or more
Amount of sludge produced	;	40 % of B.O.D.
Maintenance and operation	;	Inspection once a month or so
Power consumption	;	Small
Sludge return	;	None
Recovery from accident	;	2 or 3 days
Load regulating capacity	;	Large
Nitrogen treating capacity	;	Large
Plot for treatment works	;	Large

As shown in the above study, these four treatment methods have both sides of a merit and demerit, therefore it was difficult to decide of their superiority or inferiority. But by comparison of construction cost, Oxidation Ditch is the lowest cost system, and Activated Sludge Process is the highest cost one.

The Fig. M-2-12 indicates the comparative chart of the construction costs.

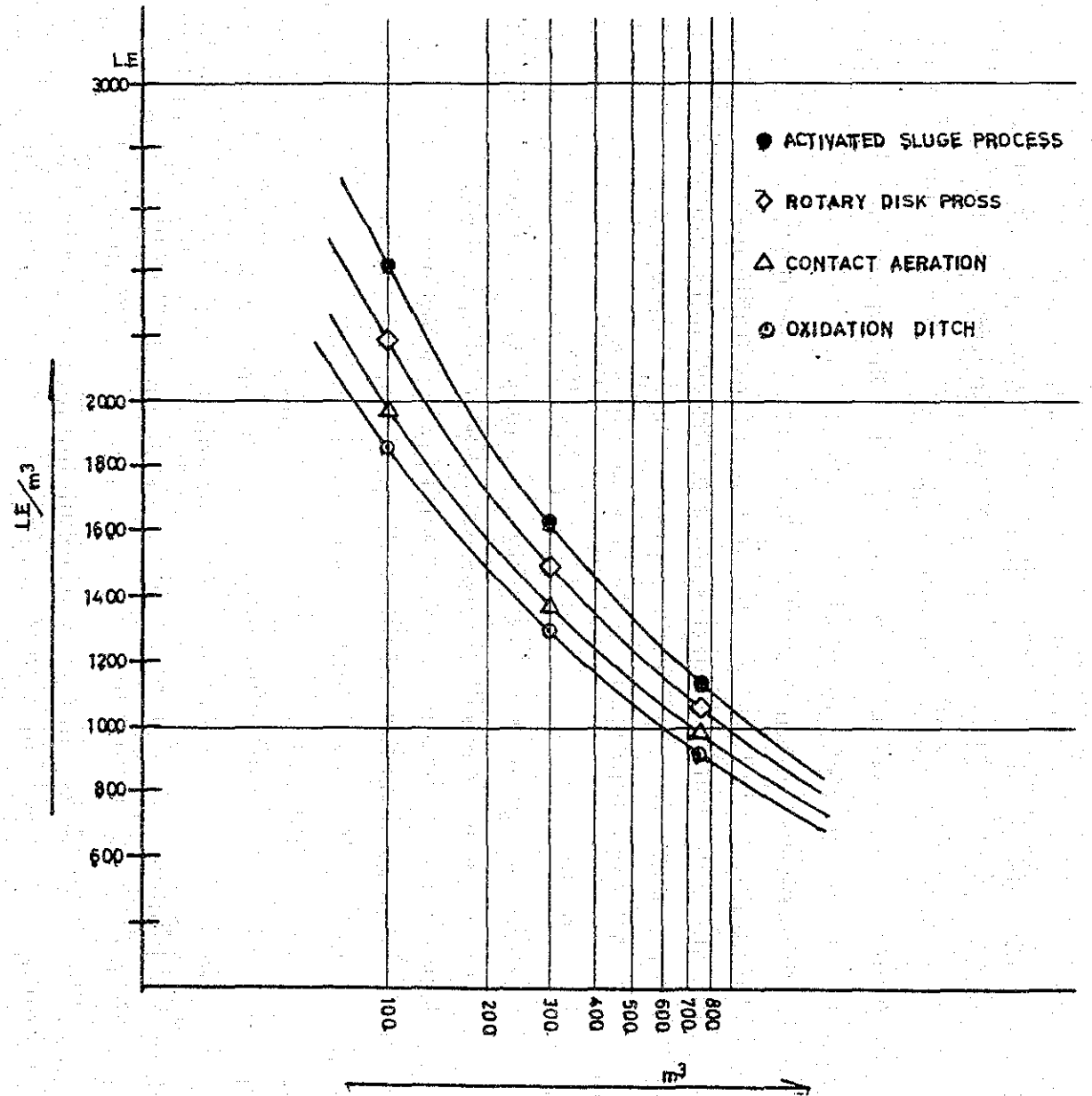


Figure M-2-12 Comparative chart for construction cost

Oxidation Ditch system requires a large plot for treatment works, but this system will be profitable if land-use plan can be well arranged.
Eventurally, Oxidation Ditch will be adopted as the sewage treatment system for the project.

Each village will have one unit of this system.

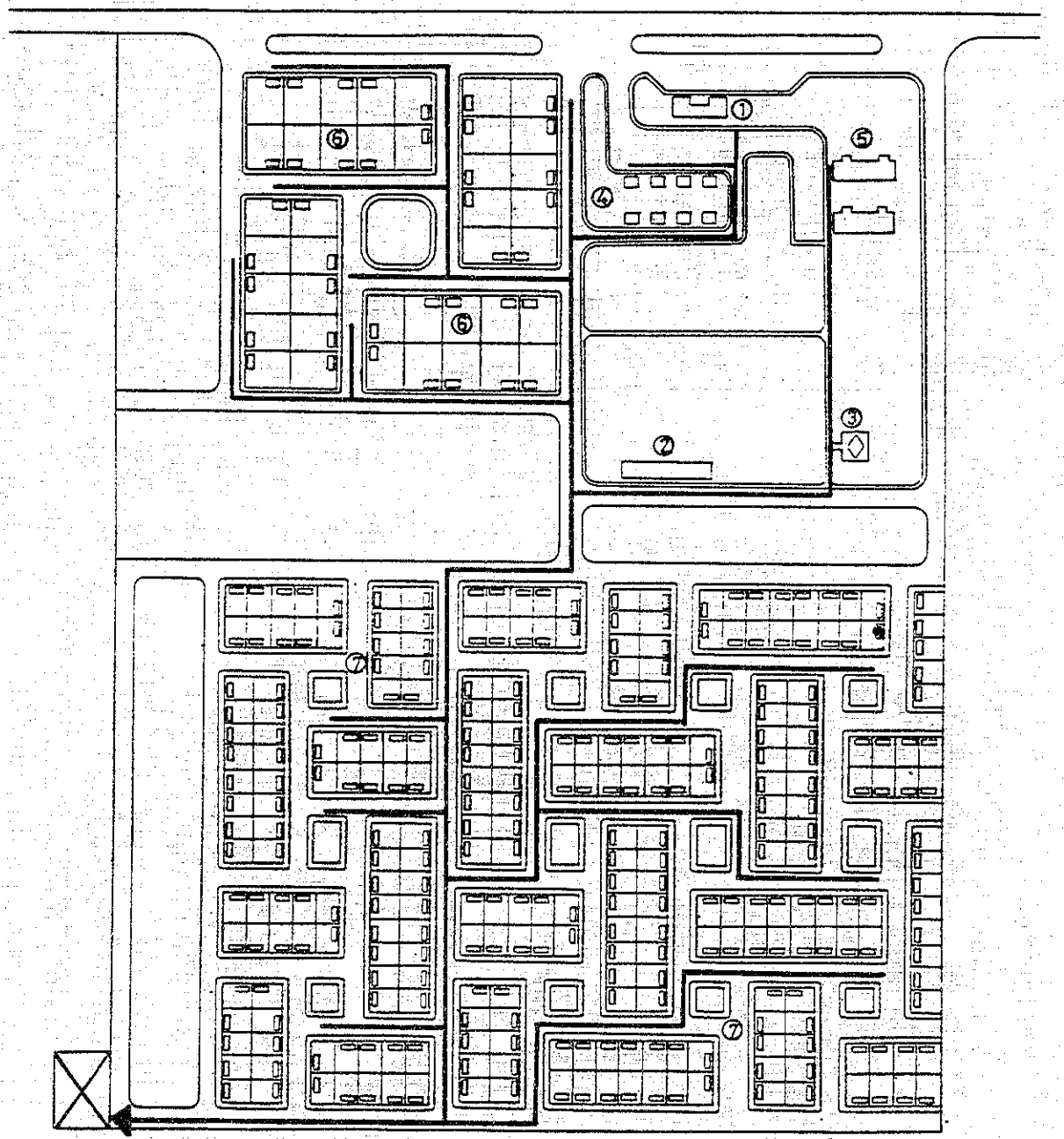
This system is so designed as that air and sewage are mixed in the open ditch. Oxygen-using bacteria grow digest sewage and liquidify most solids. Liquid discharges to canals after disinfection.

Satellite Village;	2000 persons' system
Service Village ;	2000 persons' system
Central Village ;	5000 persons' system

Design criteria for Oxidation Ditch are shown below;

Daily maximum waste water ;	150 lit/man. day
Estimated influent quality;	B.O.D. 200ppm (200mg/lit)
	S.S. 200ppm (200mg/lit)
Estimated effluent quality;	B.O.D. 60ppm (60mg/lit)
	S.S. 30ppm (30mg/lit)
Estimated population ;	p1= 2000 persons
;	p2= 5000 persons

From the view point of sewage treatment system, the proposed pipeline netword for each kind of village will be provided as shown in Fig. M-2-13-15, and the facilities of sewage works needed are given in Table M-2-7.



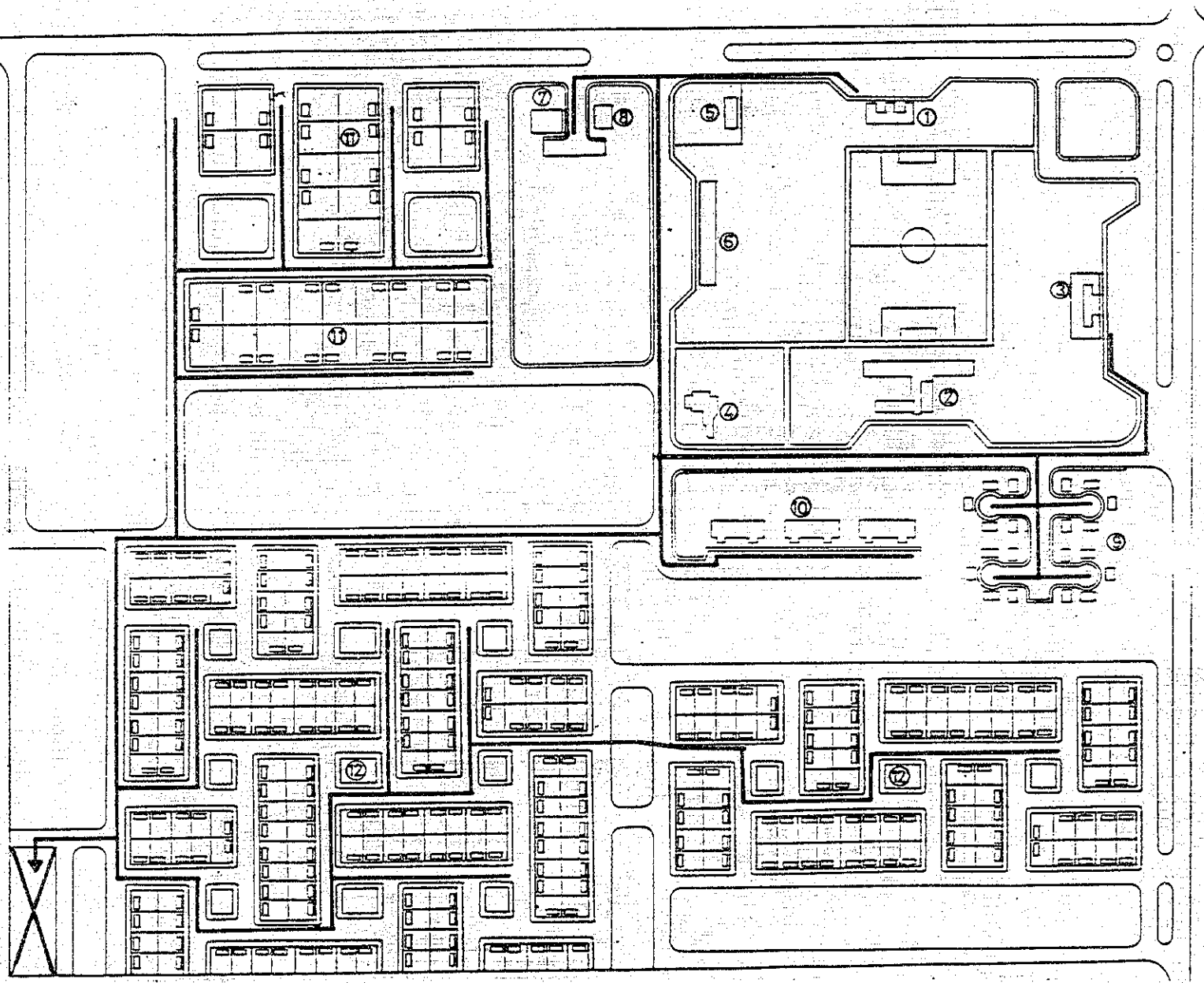
① AGRI. ADMINISTRATIVE OFFICE
② GROUP OF SHOPS
③ MOSQUE
④ TECHNICAL LABORERS HOUSE
⑤ APARTMENT
⑥ OWNERS' HOUSE
⑦ FARMERS' HOUSE

SEWAGE TREATMENT WORK

PIPELINE

0 50 100m

Figure M-2-13
Sewage Water Pipeline
(Satellite Village)

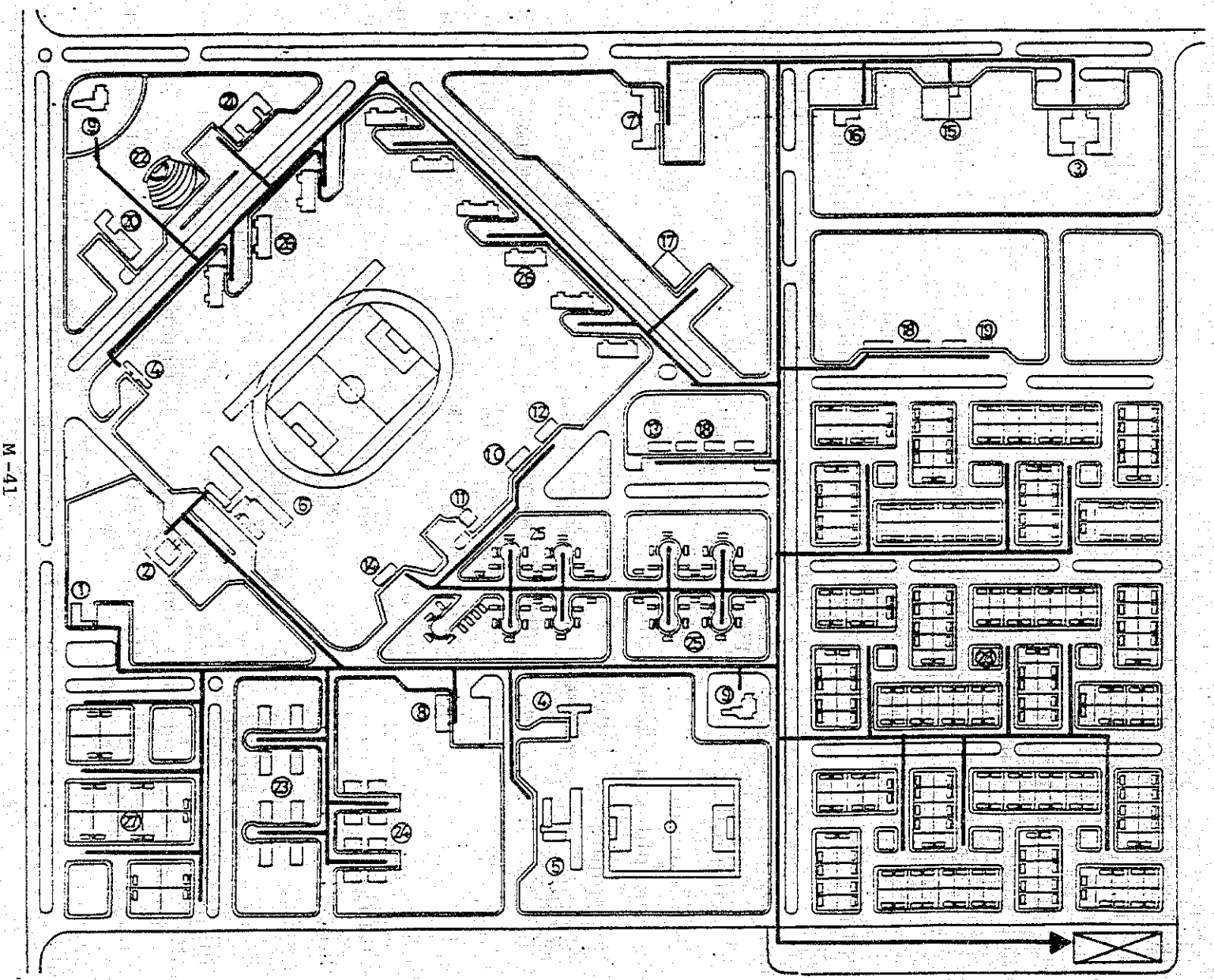


1 VILLAGE DEVELOPMENT OFFICE
2 COMBINED SCHOOL
3 MEDICAL TREATMENT UNIT
4 MOSQUE
5 AUTO SERVICE
6 MARKET WITH BAKERY
7 DIRETORS' HOUSE
8 ASS'T DIRECTORS' HOUSE
9 TECHNICAL LABORERS' HOUSE
10 APARTMENT
11 OWNERS' HOUSE
12 FARMERS' HOUSE

SEWAGE TREATMENT WORK
PIPELINE

0 50 100m

Figure M-2-14
Sewage Water Pipeline
(Service Village)



1. VILLAGE DEVELOPMENT OFFICE
2. ADMINISTRATION OFFICE
3. ARTIFICIAL INSEMINATION CENTER
4. NURSERY SCHOOL
5. COMBINED SCHOOL
6. HIGH SCHOOL
7. HOSPITAL
8. MEDICAL TREATMENT UNIT
9. MOSQUE
10. POLICE STATION
11. POST OFFICE
12. FIRE STATION
13. STORE
14. VILLAGE BANK
15. WORKSHOP
16. AUTO SERVICE
17. MARKET WITH BAKERY
18. GROUP OF SHOPS
19. SEPARATED BAKERY
20. REST HOUSE FOR EMPLOYEES
21. CLUB
22. CINEMA/THEATRE HOUSE
23. DIRECTORS' HOUSE
24. ASS'T DIRECTORS' HOUSE
25. TECHNICAL LABORERS' HOUSE
26. APARTMENT
27. OWNERS' HOUSE
28. FARMERS' HOUSE

SEWAGE TREATMENT WORK

PIPELINE

0 50 100m

Figure M-2-15
Sewage Water Pipeline
(Central Village)

Table M-2-7 Facilities of Sewage works

Treatment system for 3,500 persons (Satellite and Service Villages)	48 sets
Treatment system for 3,000 persons (Central Villages)	3 sets
Treatment system for 10,000 persons (Town)	1 set
Connecting pipe network	
- Satellite Village	40 units
- Service Village	8 units
- Central Village	3 units
- Town	1 unit

b) Treatment of Refuse Garbage

Trucks will be used to collect garbage which will be gathered at a specified pit, and buried and resolved in the soil. Combustible materials will be incinerated.

(5) Electric Power

a) Distribution Plan

A high voltage cable (220 kV) runs along the Port Said - Ismailia highway, and will be utilized as the power source for the project area. The No.1 substation is planned at the connecting point of the Suez Canal and the El Salam Canal. The voltage will be drawn down from 220 kV to 66 kV at the No. 1 substation. A high voltage transmission line (66 kV) will be constructed along the El Salam Canal from the No.1 substation to the No.2 substation planned at the crossing of the El Salam Canal and the Bahr El Baqar Drain. The voltage will be drawn down from 66 kV to 11 kV at the No.2 substation. From the substation, 11 kV lines will be extended to villages, drainage pumping stations, purification plant, agro-industry, etc. Village and various facilities requiring power will be provided with transformer to obtain the appropriate voltages. (See Figs. M-2-16 and M-2-17)

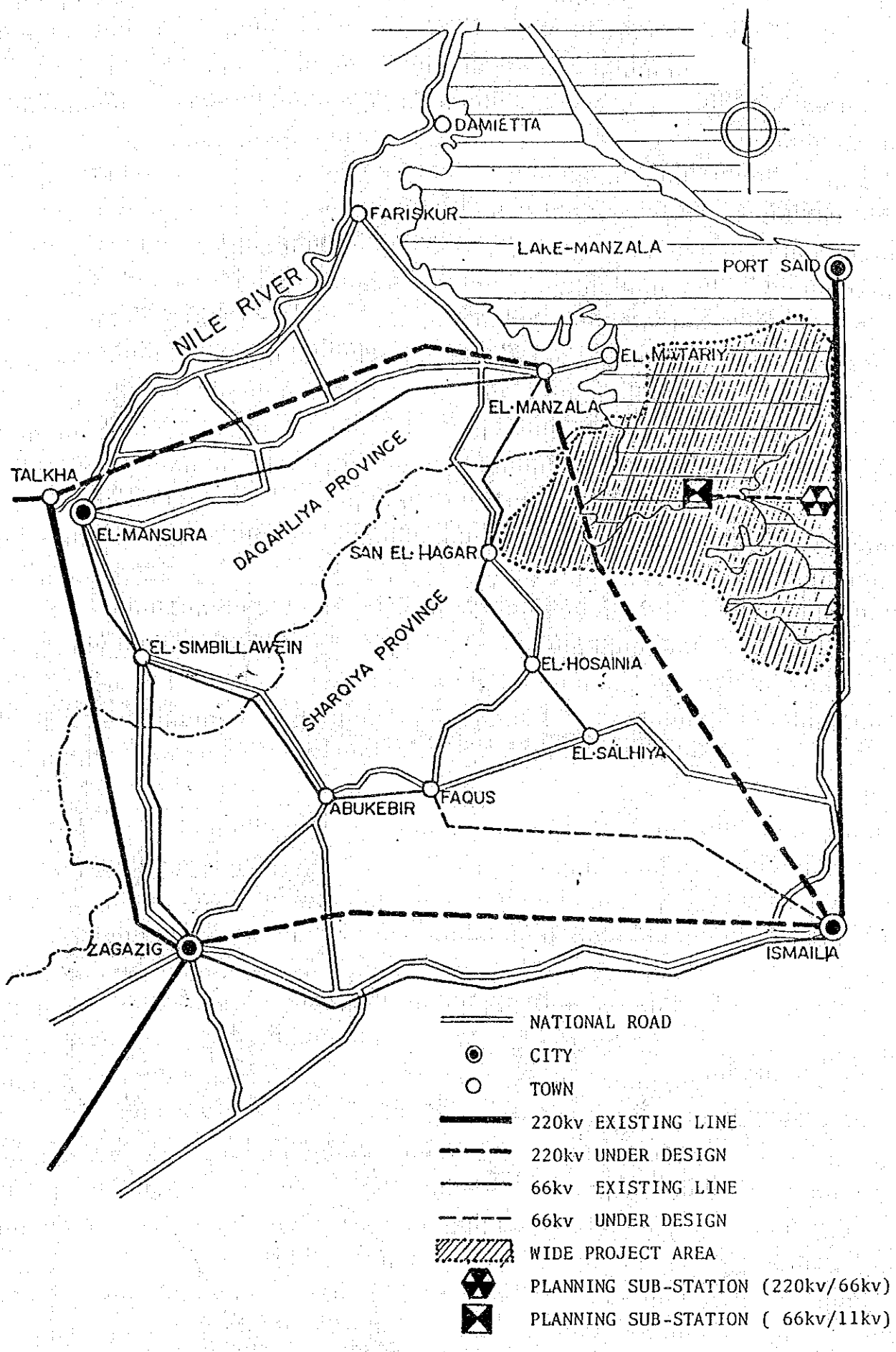


Fig M-2-16 Electricity Supply Plan

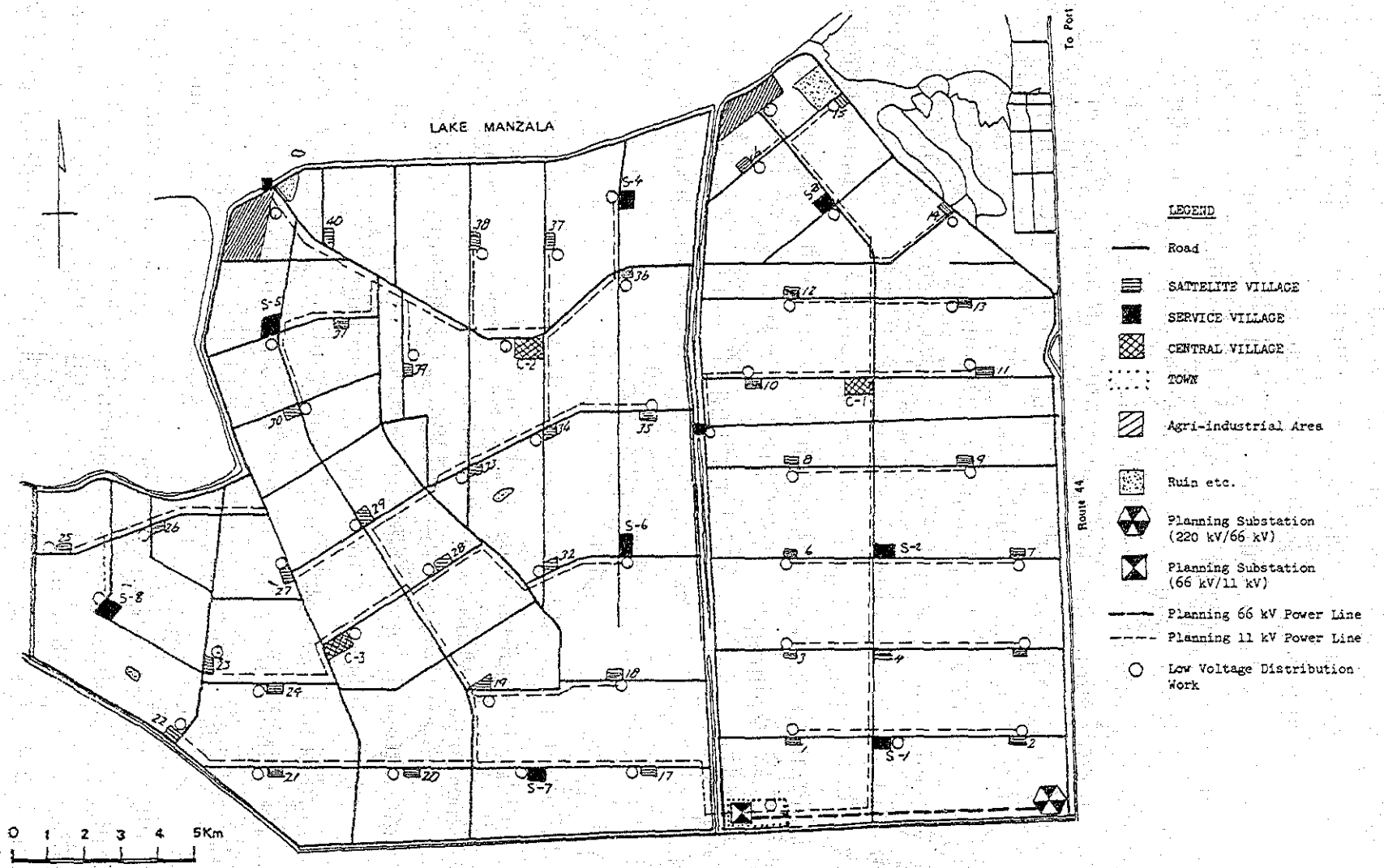


Fig. M-2-17 Alignment of Electric Lines

b) Electricity Demand

The electricity demand at farm houses was determined at 1,000 W per household at the full development stage. To reflect the higher living standards of non-farm households on an average, the power demand was decided at 2,000 W per household. This is the value commonly used by the Egyptian Rural Electrification Authority.

The other electric demand for pubic service and commercial use and street lighting, etc., has been taken at 50 kW per satellite village, 100 kW per service village, 200 kW per central village, and 500 kW per town.

The water supply pumping station will have a load requirement of about 700 kW.

The electricity demand and the facilities for electric power supply at full development stage are shown in M-2-8.

Table M-2-8 Facilities of Electric Power Supply

Village electric equipment	:	30,000 kW
Drainage pumps	:	4,100 kW
Agro-industrial electric equipment	:	8,000 kW
60 kV transmission line	:	10 km
11 kV distribution line	:	165 km
220 kV/66 kV substaion	:	1 unit
66 kV/11 kV substation	:	1 unit
Low voltage distribution works	:	55 units
Satellite village distribution network	:	40 units
Service village distribution network	:	8 units
Central village distribution network	:	3 units
Town distribution network	:	1 unit

The ratio of average annual project energy consumption to maximum demand is termed as the average annual load factor. The demand factor and annual load factor and the estimated project energy consumption are shown in Table M-2-9.

(6) Telecommunication

Telephone networks are essential for the efficient management of the project. Within the Project Area it will be necessary to have sound communication links between operation and maintenance units, pump stations and headquarters to ensure satisfactory operation of the irrigation system. Links between villages and outside cities are also necessary to ensure optimum use of the social services provided. Telephone lines will be extended from Port Said and/or Matariya to the project area. Facilities for telecommunication are shown in Table M-2-10.

Table M-2-9 Electric Demand of the Project

Item	Connected Load	Demand Factor	Maximum Demand	Av. Annual Load Factor	Annual Power Consumption
	(kW)		(kW)		(10^3 kWh)
Farm Houses	14,000	0.7	9,800	0.5	43,000
Other Houses	12,000	0.7	8,400	0.5	37,000
Satellite Village Service and Commercial	2,000	0.6	1,200	0.6	6,300
Service Village Service and Commercial	800	0.6	480	0.6	2,500
Central Village Service and Commercial	600	0.6	360	0.6	1,900
Town Service and Commercial	500	0.6	300	0.6	1,600
Water Supply	700	0.6	420	0.8	3,000
Total	30,600	0.7(av.)	20,960	0.5 (av.)	95,300

* Demand for agro-industry and drainage pumps is not included.

Table M-2-10 Telecommunication Facilities

Main cable to connect with the national networks	:	40 km
Lines within the project area	:	165 km
Central exchange station	:	1 set
Total capacity of telephone lines	:	828 lines 1/
Telex facilities	:	4 sets 2/

Notes: 1/ : Five lines per satellite village
16 lines per service village
100 lines per central village
20 lines per town

2/ : A telex system will be made available at the town and the central village.

Table M-2-11 Cost Estimation of the Social Infrastructure

Unit : 1,000 L.E.

Description	L/C	F/C	Total
1. Housing	45,360	6,186	51,546
2. Infrastructure			
Road pavement	2,808	1,322	4,130
Potable water	18,800	18,801	37,601
Sewage treatment	32,020	32,020	64,040
Electrification	3,036	2,024	5,060
Telecommunication	5,372	16,116	21,488
Village Facilities	13,763	3,441	17,204
[Sub Total]	[121,159]	[79,910]	[201,069]
3. Engineering & Administration	18,174	11,989	30,160
[Base Cost]	[139,333]	[91,896]	[231,229]
4. Physical Contingencies	27,866	18,380	46,246
[Sub Total]	[167,199]	[110,276]	[277,475]
5. Price escalation	386,592	70,377	456,969
Total Cost	553,791	180,653	734,444

Table M-2-12 Annual Disbursment Schedule [Social Infrastructure]

Unit : 1,000

YEAR	L/C	F/C	Total
1986	-	-	-
1987	-	-	-
1988	4,564	3,139	7,703
1989	8,786	5,603	14,389
1990	9,255	9,495	18,750
1991	24,118	16,348	40,466
1992	82,521	29,148	111,669
1993	81,333	25,190	106,523
1994	161,197	44,178	205,375
1995	82,134	23,027	105,161
1996	99,883	24,525	124,408
Total	553,791	180,653	734,444