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FEASIBILITY STUDY ON SHARQIYA SEWERAGE SYSTEM
IN THE ARAB REPUBLIC OF EGYPT

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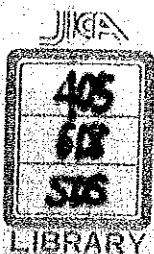
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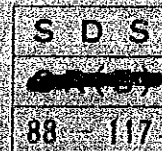
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**FEASIBILITY STUDY ON
SHARQIYA SEWERAGE SYSTEM
IN THE ARAB REPUBLIC OF EGYPT**

FINAL REPORT
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FEASIBILITY STUDY
ON
SHARQIYA SEWERAGE SYSTEM
IN
THE ARAB REPUBLIC OF EGYPT

FINAL REPORT

CONSTITUENT VOLUMES

VOLUME ONE SUMMARY REPORT
VOLUME TWO MAIN REPORT
VOLUME THREE APPENDICES
VOLUME FOUR DRAWINGS

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APPENDIX - I

FIELD SURVEY ON POPULATION DENSITY

Appendix - I

FIELD SURVEY ON POPULATION DENSITY

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1. Background

For the sewerage planning, accurate population data in the study area is essential in estimating future sewage quantities and characteristics. In the study area, however, basic information indicating population densities under different categories, such as housing and commercial districts, are lacking. A survey was, therefore, carried out from August 13 to 17, 1987, at selected representative areas in Zagazig and Faqus cities by the members of the study team in close cooperation with the Sharqiya Governorate counterpart staff.

2. Method of Survey and Selection of Sites

2.1 Survey Method

For the field survey, house to house visit inquiries were made to all the families living in the selected areas.

First, the number of dwellers in the buildings were checked by direct inquiries, and thence, the actual building areas were measured. Public spaces such as streets, drains, canals, parks, etc. were measured on the maps with scale of 1:1,000 prepared for the telecommunication systems. The entire area of the selected districts for the survey were also measured from the maps. The population densities were then estimated based on these data. The procedures are summarized below:

- Count the number of dwellers (N_d) in the buildings by direct inquiries.
- Measure the area of buildings (A_b) in the field.
- Measure the area of such public facilities (A_p) as streets and drains on the maps.
- Measure the entire selected areas (A_s) on maps, and
- Calculate population densities.

2.2 Selected Sites for Field Surveys

The cities in the Governorate may be classified into two major types according to the level of urbanization and population density; comparatively modernized and highly builtup cities like Zagazig and Bilbeis, and local community centers of less developed cities like Faqus and Minyet El Qamh.

For the survey, Zagazig and Faqus cities are selected as the representative areas for the two types of cities. Both of the cities have the maps of 1:1,000 prepared in 1982 for telecommunication cable systems by a Telephone Company, showing some details of physical facilities.

As both cities consist mainly of commercial and housing zones, the following zones are selected for the study:

- (1) Commercial areas
 - Most crowded and active commercial area.
 - Commercial area with normal conditions.
- (2) Housing area
 - High-class housing area
 - Middle-class housing area
 - Low-class housing area

Since both cities do not have any distinct industrial zones within the administrative areas, the industrial areas are excluded from the field survey. The government and institutional areas are also excluded. The portion of these areas are small in the cities and, as such, the exclusion of these areas from the study is unlikely to have any effect to the study results.

The conditions of the commercial areas with respect to population density are considered similar to those in the middle-class housing areas, because such commercial areas are, in general, located in middle class housing areas. The data obtained from middle-class housing area are therefore applied to the normal commercial areas.

3. Field Survey

3.1 Preparation of the Survey

Since the selection of the most appropriate areas representative for the conditions in the study area is an important element in obtaining accurate data, intensive discussions and consultations with the city officials concerned took place to determine the places for the survey. The meetings were as follows:

(1) Zagazig City

Date : August 13, 1987 (Thu)
Place : The office of Eng. Fahmy Sheetwy, Zagazig City Office
Attendants : Mr. Nabil E.A. Hassan (Sharqiya Governorate)
: Staff of Mr. Nabil, three (- do -)
: Eng. Fahmy Sheetwy (Zagazig City)
: Staff of Eng. Fahmy, two (- do -)
: Mr. Machida (Study team)
: Mr. Oga (- do -)

Selected Area: Commercial area

(a) Most crowded area: Said Al Street

Housing area

(a) High class area : Koumeiya Street

(b) Middle class area: Afahsha Street

(c) Low class area : Saleh Sadik Street

(2) Faqus City

Date : August 17, 1987 (Mon)
Place : The meeting room of Faqus City Office
Attendants : Mr. Nabil E.A. Hassan (Sharqiya Governorate)
: Staff of Mr. Nabil, one (- do -)
: Eng. Talaat Mohammed (Faqus City)
: Staff of Eng. Talaat, three (- do -)
: Mr. Machida (Study team)
: Mr. Suzuki (- do -)
: Mr. Oga (- do -)

Selected area: Commercial area

(a) Most crowded area: Gomorea Street

Housing area

(a) High class area : Mostafa Kalin Street

(b) Middle class area: Saubasha Street

(c) Low class area : Sidi-Sara Street

3.2 Field Survey in Zagazig City

The field survey in Zagazig City was carried out on August 16, 1987, at four selected locations as previously mentioned, by the staff of Governorate, Zagazig City and the study team. The locations and details of surveyed areas are shown in Figures I-1 through I-5, and the results are summarized in Table I-1. The average population density of the commercial area was estimated to be around 500 persons/ha, or higher, while that in the housing area was between 900 and 1,300 persons/ha.

3.3 Field Survey in Faqus City

On August 17, 1987, the field survey was undertaken at the selected four locations in Faqus City by the study team in close cooperation with the Governorate and city staff. The locations and details of the four surveyed areas are shown in Figures I-6 through I-10, and the results thereof are indicated in Table I-2. The survey results indicate that the population densities in the commercial area was approximately between 500 and 800 persons/ha, and those in the housing area from 800 to 1,300 persons/ha.

4. Conclusions

4.1 Commercial Areas

The survey indicates the most densely populated and vigorous commercial districts of Zagazig and Faqus cities are not necessarily most heavily populated areas by dwellers. Said Al Street is, for example, one of the most vigorous commercial centers of Zagazig City, which is crowded by shoppers most of the time of day, and so is Gomorea Street in Faqus City. These areas are mostly builtup zones with high-rise buildings, and almost all the ground floors are used as shops mainly for retailers and some for wholesalers, with storage space behind the shops.

These shops do not, generally, have attached living quarters, and more than 50 per cent of the shop owners and their employees reportedly come to work from their houses in other locations. As for the area of buildings occupied by one dweller, the most crowded commercial area has the lowest in Zagazig and Faqus cities, as shown in the column A/B in the Tables I-1 and I-2. The number of dwellers per m^2 of building floor space is 0.074. Using this figure, the population densities of the most crowded commercial areas in Zagazig and Faqus cities are estimated as follows:

- Zagazig City: 520 persons/ha
- Faqus City : 470 persons/ha

The normal commercial districts seem to be similar to the middle-class housing area in nature. As observed earlier, this type of commercial area is generally located in the middle class housing areas, and the spaces for commercial activities and housing are mixed. For this reason, the data obtained from the middle class housing area are applied to estimate the population densities in the normal commercial areas as follows:

- Zagazig City: 1,270 persons/ha
- Faqus City : 770 persons/ha

4.2 Housing Areas

In the high class housing areas, the average number of stories in buildings is 8 in Zagazig, whereas that in Faqus is 5 stories and in some buildings are 6 stories high. Building areas per family are about $18 m^2$ in Zagazig, and $24 m^2$ in Faqus, and the dweller number per building area is $0.236 \text{ persons}/m^2$ in Zagazig, and $0.222 \text{ persons}/m^2$ in Faqus. These differences are attributable to the difference in the number of stories of the buildings between Zagazig and Faqus.

The ratio of the area occupied by buildings to the entire land area is lower in Zagazig than in Faqus, accounting for 40 per cent and 60 percent respectively. This means Zagazig City has wider public spaces such as roads and parks than Faqus. Using the data, the population densities in the high-class housing area are estimated as follows:

- Zagazig City: 1,020 persons/ha
- Faqus City : 1,310 persons/ha

The population density in middle-class housing areas is similar to that in normal commercial area.

The number of stories in buildings in low-class housing area is in general lower than in other areas. The ratio of area occupied by buildings to the entire area is not necessarily high compared with other areas. This is because low-class housing areas are generally located close to such public areas as drains, railways and cemeteries.

It was observed that the number of stories in the buildings were different and depended on its locations. In Zagazig, the buildings are generally one or partly two storied, and in Faqus two or partly three storied. Building area per family in Zagazig and Faqus is about 24 m² and 20 m² respectively. These are very close to those in the high class housing areas in both cities.

The survey results indicate that the number of dwellers per total building floor space in low-class housing areas is about 2 to 8 times that in high-class housing areas. In fact, it was observed in Zagazig City that in some cases, one family with 5 to 6 members live in a single room of approximately 5 m x 5 m.

The population density of the low-class housing area is not always high compared with other classes of housing mainly due to the difference in the number of stories in the buildings, though the number of dwellers per total floor space is high. The population densities in the low-class housing areas are calculated as follows:

- Zagazig City: 930 persons/ha
- Faqus City : 1,110 persons/ha

4.3 Comparison with Data in Other Similar Cities

In order to compare these results with other data, population density figures surveyed in other Egyptian cities are tabulated in Table I-3.

4.4 Conclusions

The population densities thus estimated are representative for the average conditions of urban areas in the Governorate and is believed to be sufficient for use for master plan purpose. It should be noted, however, that particular cases that deviate from these conditions, these figures should be adjusted to fit the actual condition. For master plan purposes, the following densities are suggested:

(Unit: Persons/ha)

	<u>Zagazig</u>	<u>Faqus</u>
<u>Commercial Area</u>		
(a) Most Crowded	500	450
(b) Normal	1,250	750
<u>Housing Area</u>		
(a) High-Class	1,000	1,300
(b) Middle-Class	1,250	750
(c) Low-Class	950	1,100

- Legend: ●1 : Said Al St.
 ●2 : Koumeiya St.
 ●3 : Afahsha St.
 ●4 : Saleh Sadik St.



S : 1 / 25,000

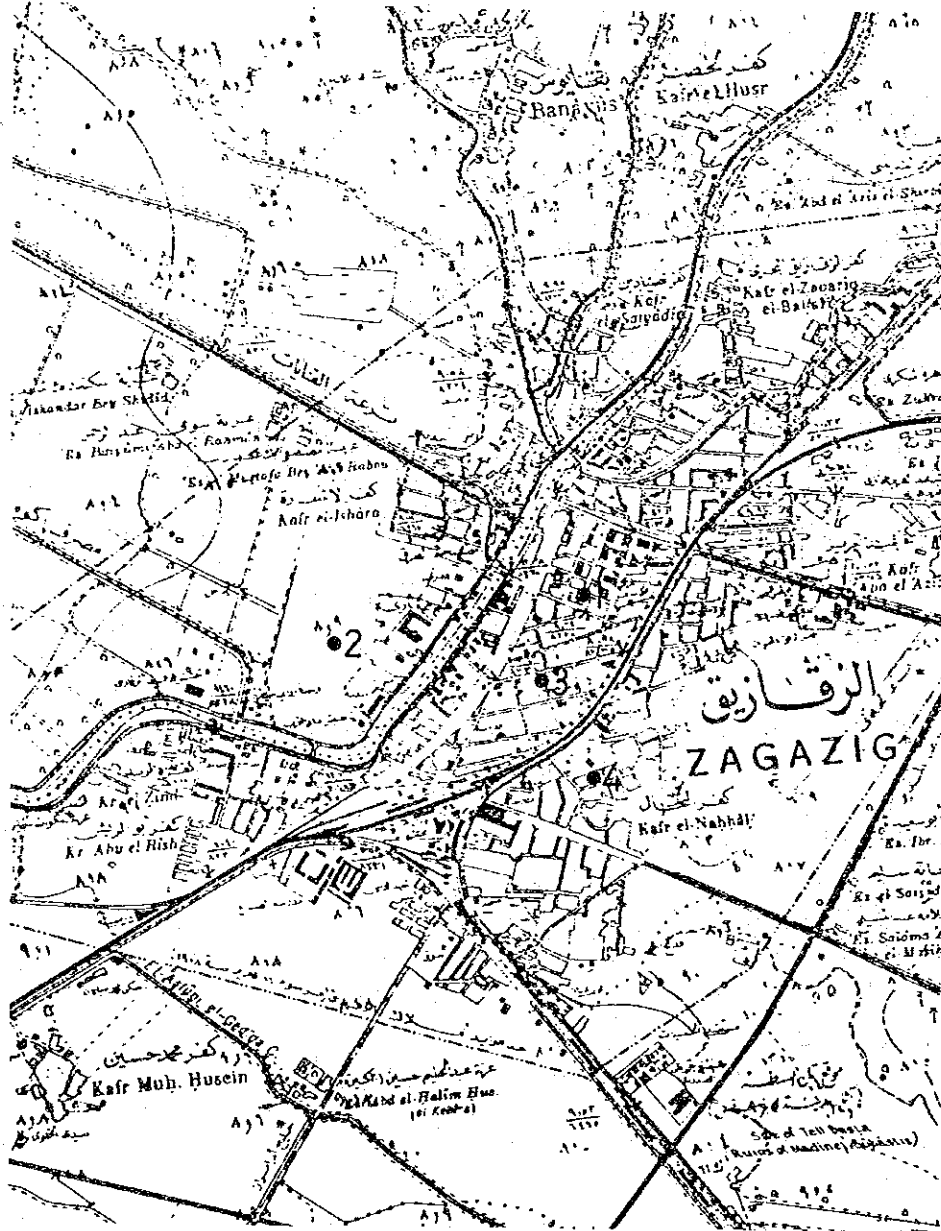




Figure I-1 Location of The Survey Sites in Zagazig City

Legend :  Surveyed Building
 Selected Area

S : 1 / 1,000

Selected Area = 19,600 m²

Building Area in Selected Area = 13,737 m²

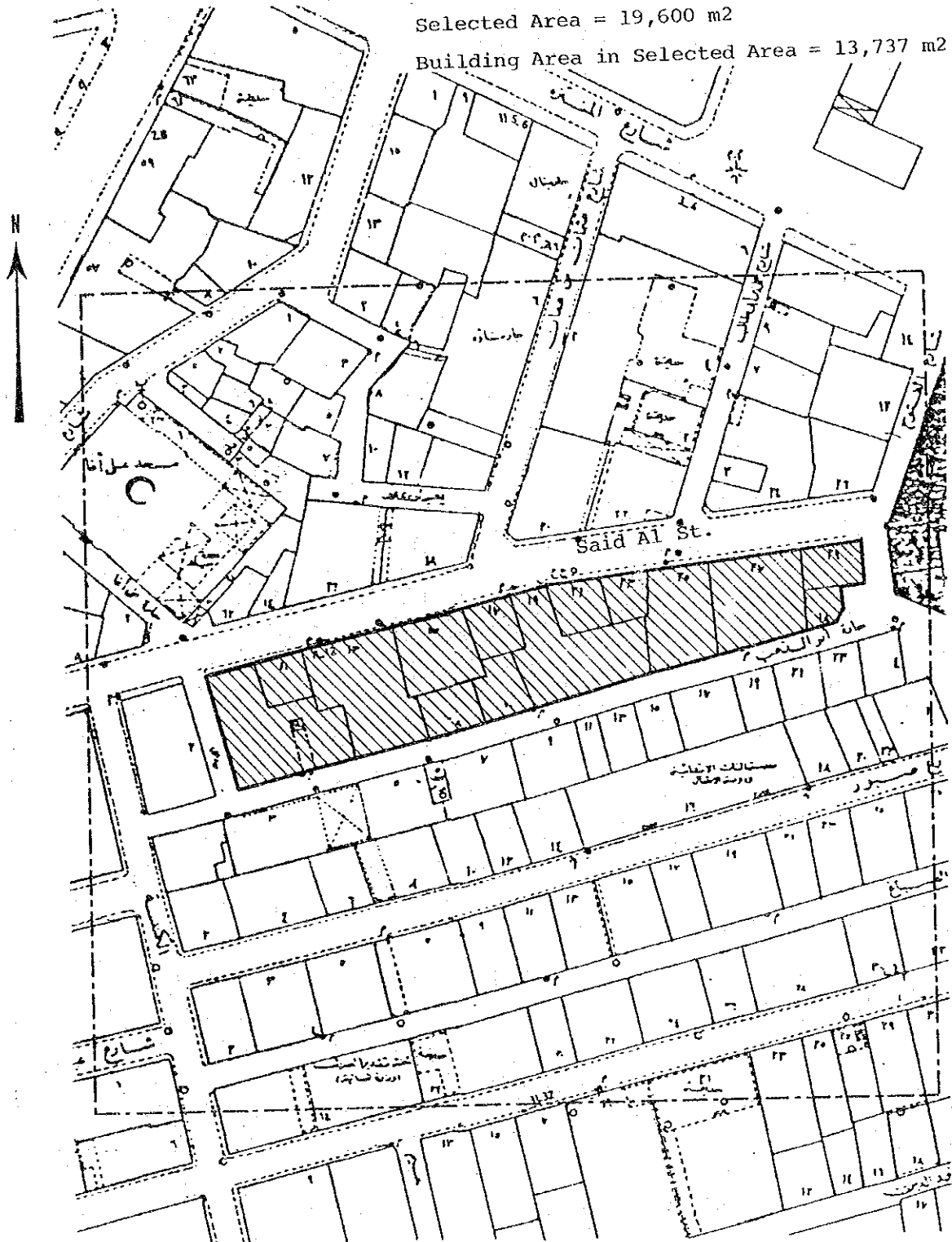


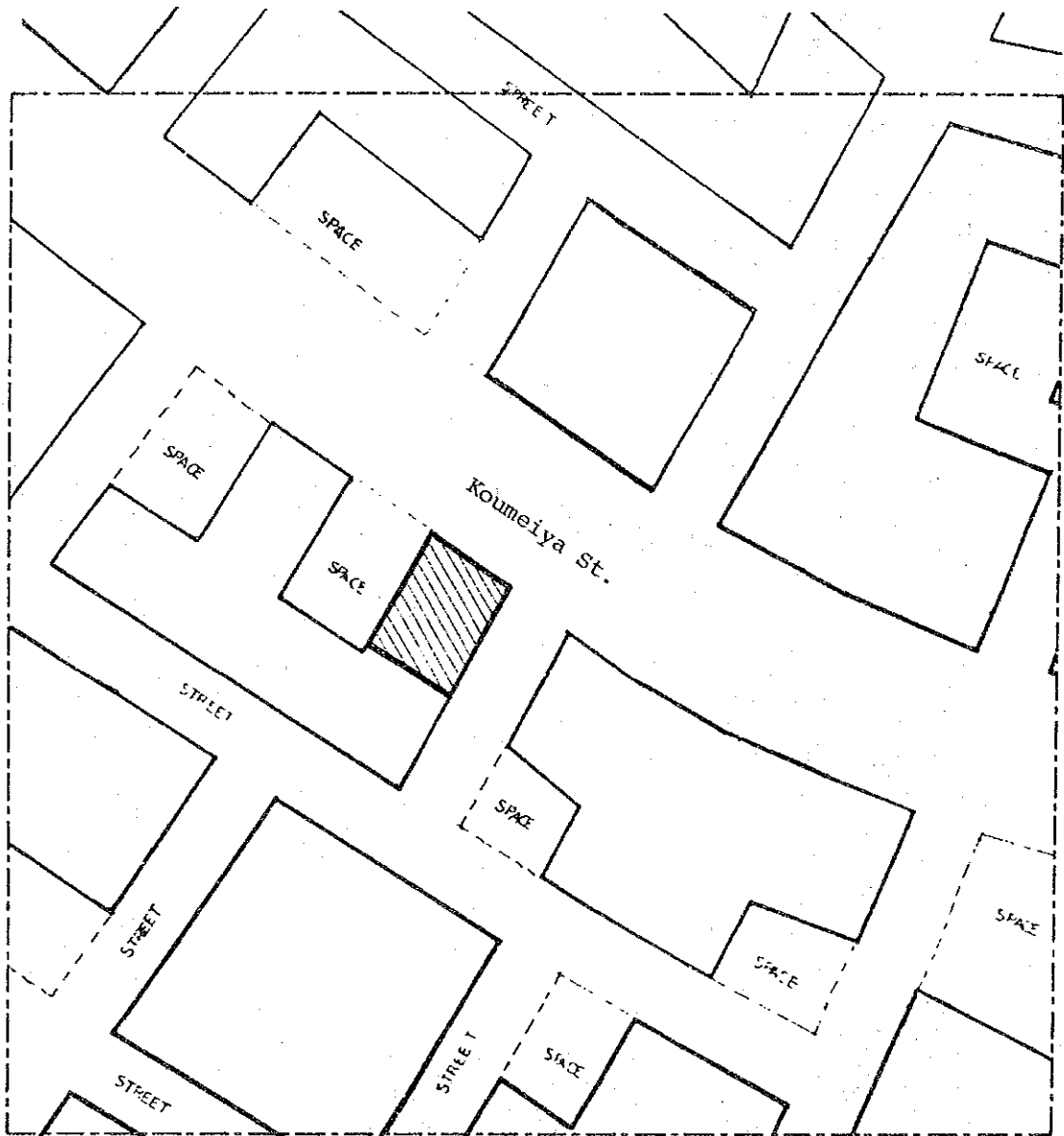


Figure I-2 Said Al Street, Zagazig City



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Legend :  Surveyed Building
 Selected Area



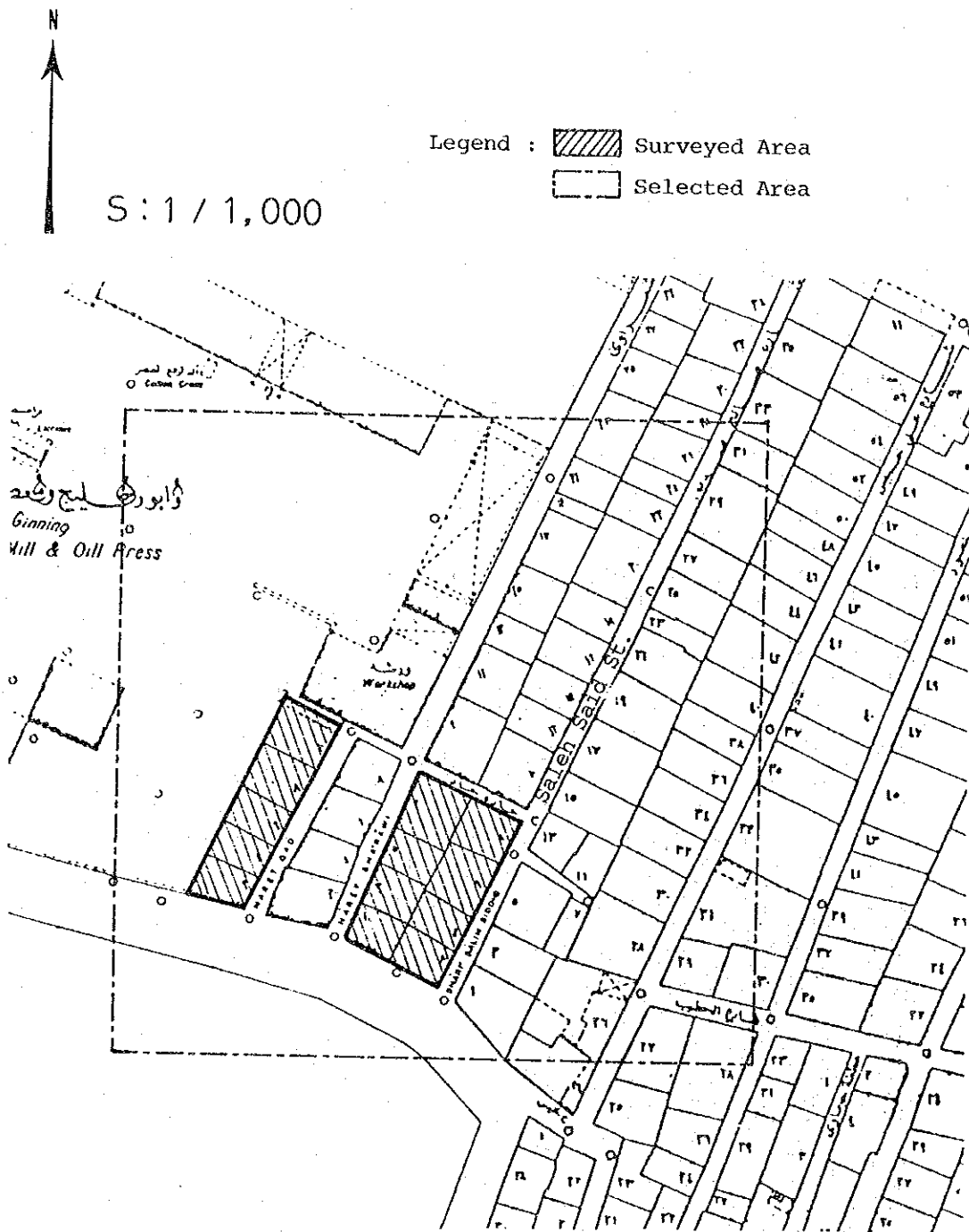
Selected Area = 22,500 m²

Building Area in Selected Area = 9,745 m²

Figure I-3 Koumeiya Street, Zagazig City



Figure I-4 Afahsha Street, Zagazig City



Selected Area = 10,000 m².

Building Area in Selected Area = 4,613 m²

Figure I-5 Saleh Said Street, Zagazig City

Table- I-1 Population Density Survey (Zagazig City)

<u>Area</u>	<u>Street Name</u>	<u>Number</u>		<u>Area of Building (B)</u> (m ²)	<u>A/B</u> (persons/m ²)	<u>Building Ratio*</u> (%)	<u>Population Density</u> (persons/ha)	
		<u>Family</u>	<u>Person(A)</u> (persons)					
<u>Commercial Area</u>	(a) Most Crowded	Said Al St.	42	169	2,274	0.074	70.1	519
	(b) Normal	**	24	112	640	0.175	72.5	1,269

Housing Area

(a) High Class	Koumeiya	13	55	233	0.236	43.3	1,022
(b) Middle Class	Afahsha St.	24	112	640	0.175	72.5	1,269
(c) Low Class	Saleh Sadik St.	31	149	740	0.201	46.1	927

(Note) * : (Building Ratio) = (Area of buildings in the selected area)/(Area of the selected area)

** : Normally operating commercial areas are deemed as middle class housing areas.

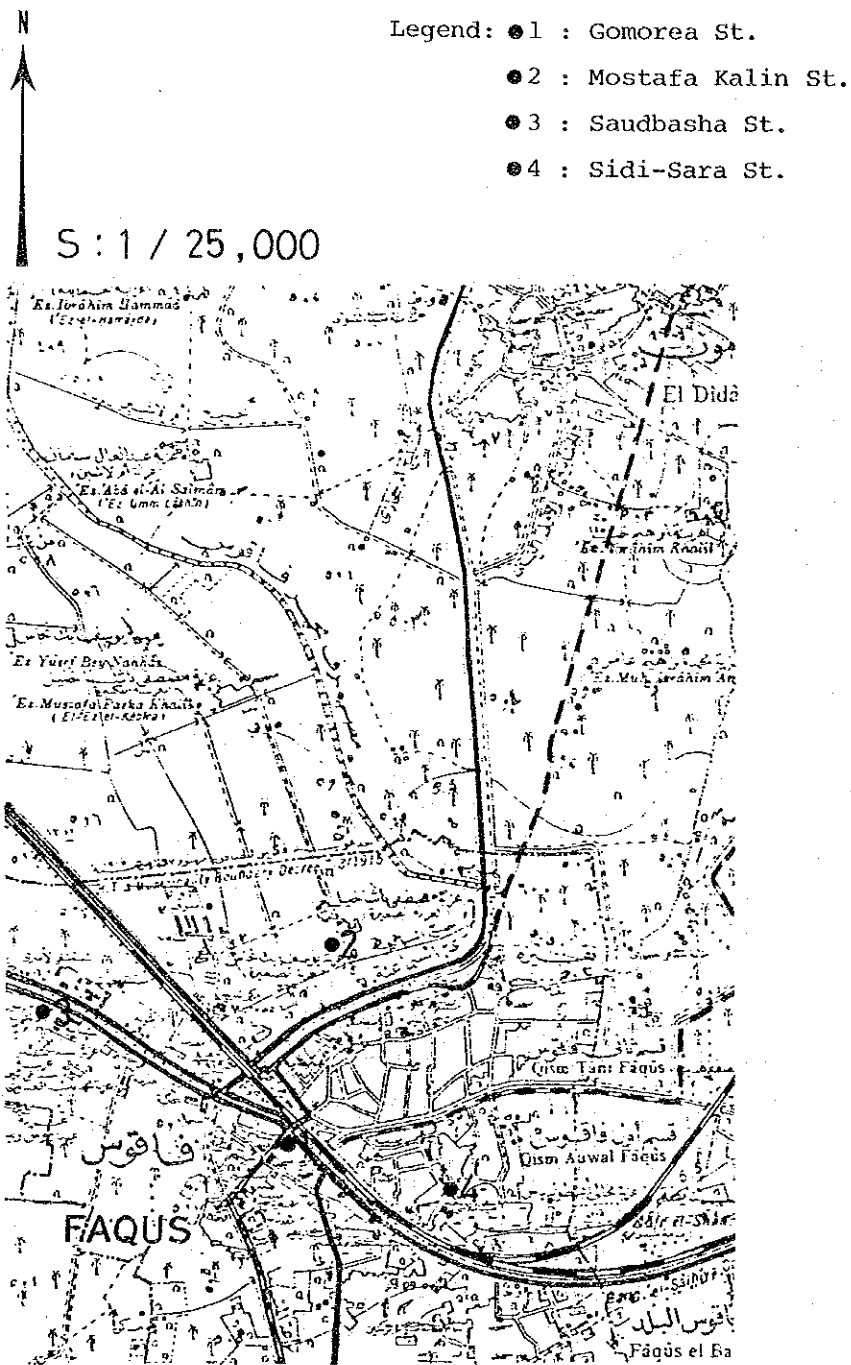
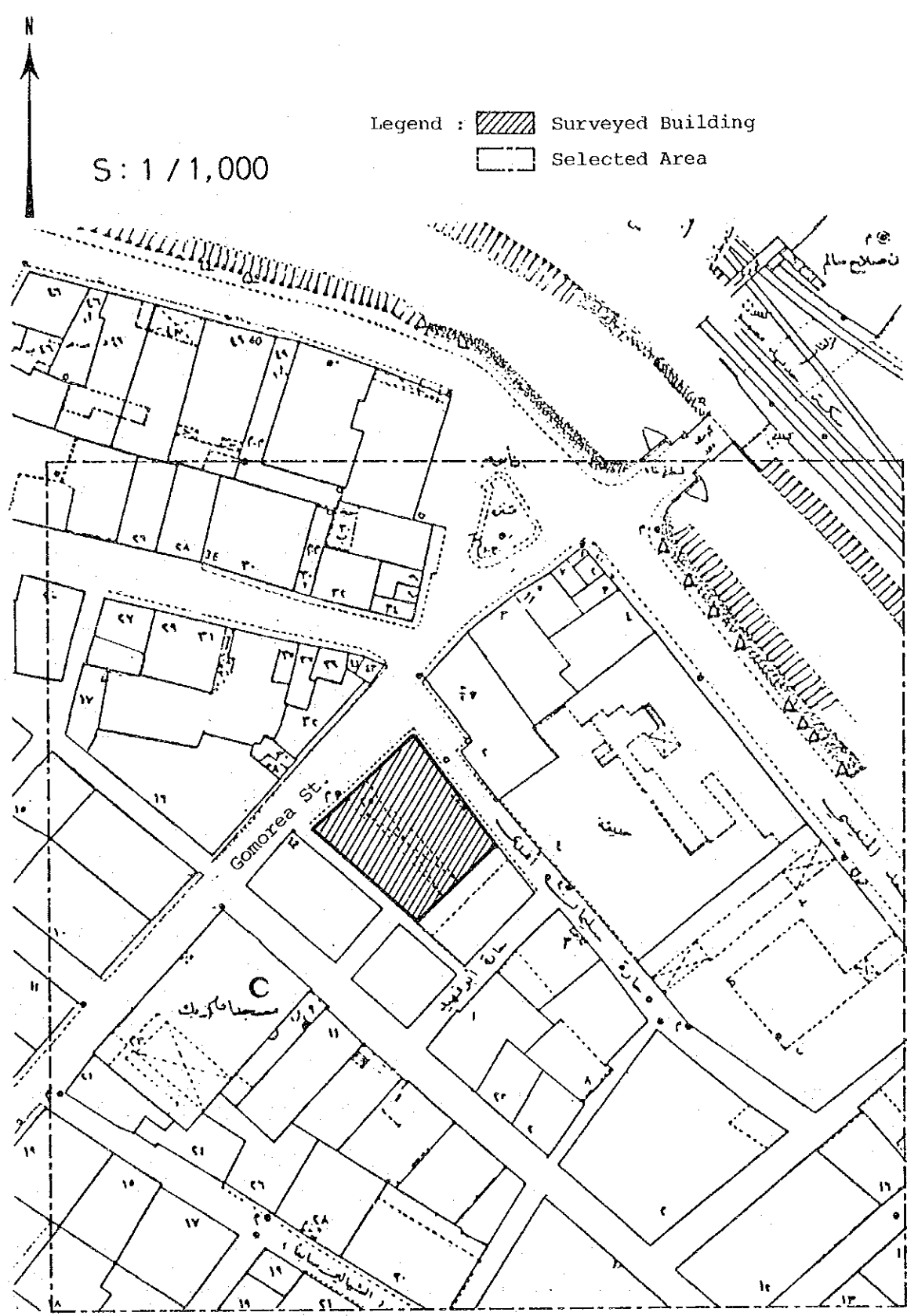




Figure I-6 Location of The Survey Sites in Faqus City



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
Legend :  Surveyed Building
 Selected Area

Selected Area = 22,500 m²

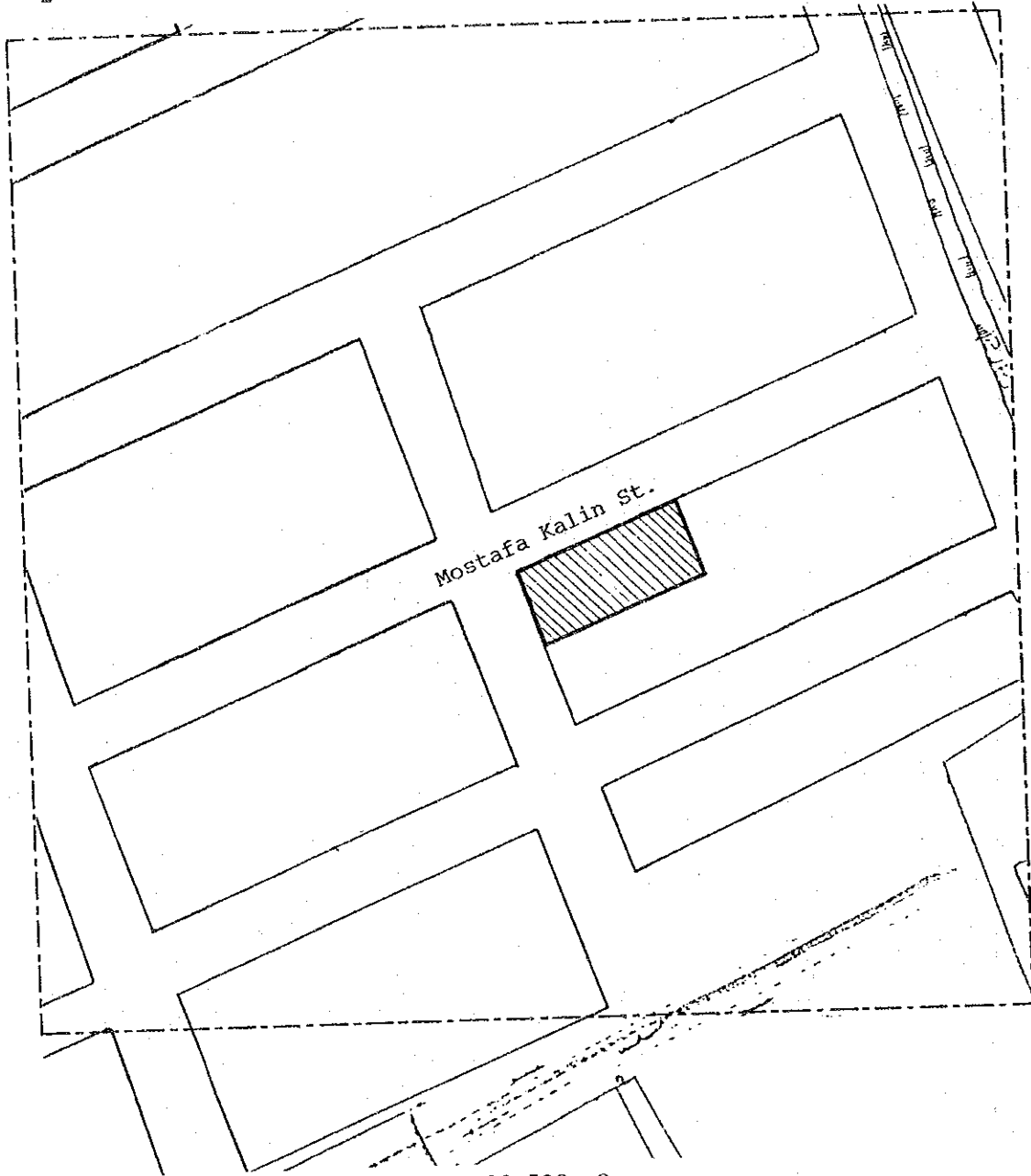
Building Area in Selected Area = 14,233 m²

Figure I-7 Gomorea Street, Faqus City



Legend :  Surveyed Building
 Selected Area

S:1/1,000





Selected Area = 22,500 m²

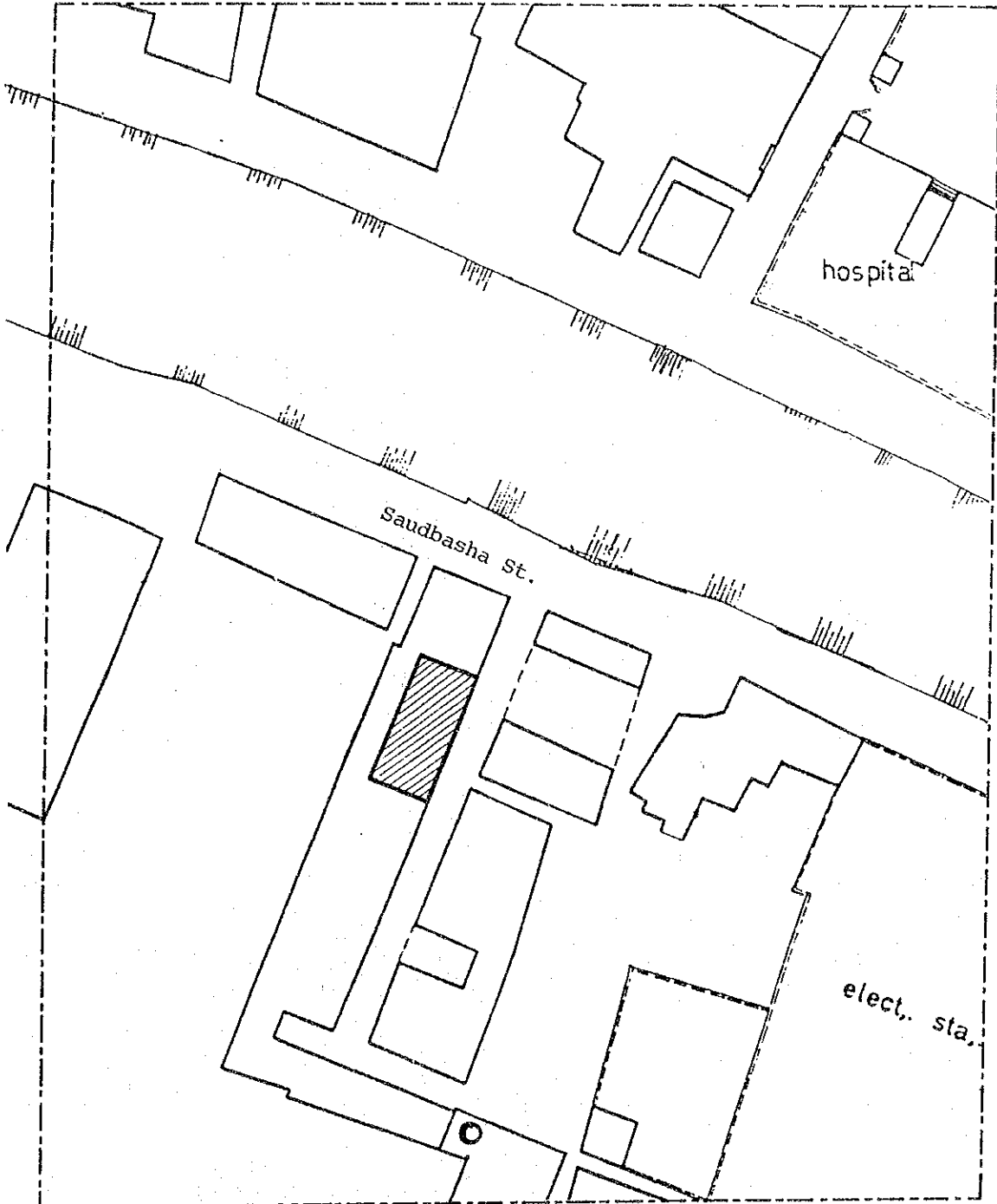
Building Area in Selected Area = 13,331 m²

Figure I-8 Mostafa Kalin Street, Faqus City



Legend :  Surveyed Building
 Selected Area

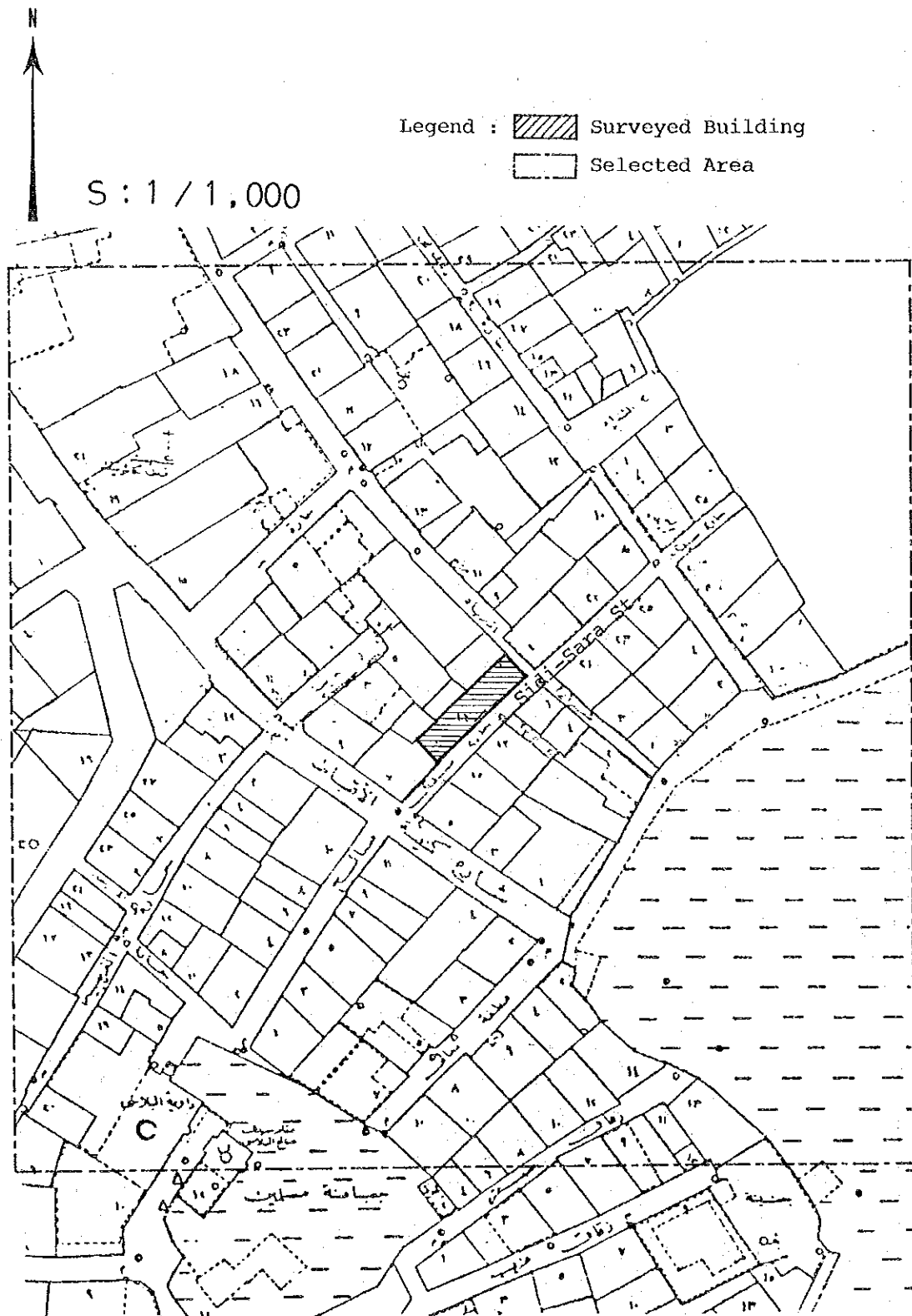
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


Selected Area = 28,500 m²

Building Area in Selected Area = 6,035 m²

Figure I-9 Saadbasha Street, Fagus City



Legend :  Surveyed Building
 Selected Area

S : 1 / 1,000

Selected Area = 22,500 m²

Building Area in Selected Area = 12,262 m²

Figure I-10 Sidi-Sara Street, Faqus City

Table- I-2 Population Density Survey (Fagus City)

Area	Street Name	Number		Area of Building(B) (m ²)	A/B (persons/m ²)	Building Ratio** (%)	Population Density (persons/ha)
		Family	Person(A) (persons)				
<u>Commercial Area</u>	(a) Most Crowded	8*	43.4*	588	0.074	63.3	468
	(b) Normally Operated ***	10*	72.5*	202	0.359	21.3	765
<u>Housing Area</u>							
(a) High Class	Mostafa Kalin St.	13	70	315	0.222	59.2	1,314
(b) Middle Class	Saubasha St.	10*	72.5*	202	0.359	21.3	765
(c) Low Class	Sidi-Sara St.	5*	20.0	98	0.204	54.5	1,112

(Note) * : The number of persons living in buildings is estimated, assuming that vacant spaces are occupied by families.

** : (Building Ratio) = (Area of buildings in the selected area)/(Area of the selected area)

*** : Normally operating commercial areas are deemed as middle class housing areas.

Table I-3 Population Densities in Other Cities

(Unit: persons/ha)

<u>City</u>	<u>Kism</u>	<u>Sub-Area</u>	<u>P.D.(1976)</u>	<u>P.D.(1985)</u>
Cairo	Ezbakia	Central	545	530
Cairo	Gamalia	Central	1,670	1,250
Cairo	Khalifa	Southern	1,308	1,266
Cairo	Maadi	Southern	270	243
Cairo	Zeitoun	Northern	496	727
Cairo	Rod El Farag	Northern	1,265	1,288
Cairo	Heliopolis	Northeast	201	234
Cairo	Nasr	Northeast	83	147
El-Arish		Northeast		129
El-Arish		Northwest		105
El-Arish		Central		114
El-Arish		Southern		194

(Note) P.D. : Population Density.

P.D. (1985) column figures of Cairo: estimated

Data Source:

Cairo ... "Master Plan of Water Supply System in the Greater Cairo Region" conducted by "General Organization for Greater Cairo Water Supply" in 1977

El-Arish El-Arish Sewerage and Drainage System by JICA in 1985

APPENDIX - II

DATA ON ENVIRONMENTAL POLLUTION CONTROL

APPENDIX - II

DATA ON ENVIRONMENTAL POLLUTION CONTROL

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1. Laws and Regulations on Environment

1.1 Decrees

(1) Decree No. 2703/1966:

This Presidential Decree of 1966 established The Supreme Committee for Water in the Ministry of Health.

(2) Decree No. 539/1980:

This Presidential Decree established the National Committee for Environment. The primary function of this high level governmental group is to formulate national environmental protection policy and to review and coordinate environmental protection activities among the numerous government ministries and organizations.

(3) Decree No. 133/1981:

This Presidential Decree established the General Organization for Sanitary Drainage for Greater Cairo.

(4) Decree No. 197/1981:

Presidential Decree No. 197 of 1981 established the public authority entitled, "The National Organization for Potable Water and Sanitary Drainage". This government entity replaces both the General Organization for Potable Water and the General Organization for Sewage and Sanitary Drainage.

(5) Decree No. 497/1981:

The Executive Agency for the Greater Cairo Sanitary Drainage Project was created by this Dcree.

1.2 Laws

(1) Law Nos. 26/1954, 60/1971, 111/1975 and 43/1974:

The requirements for establishing a company such as for agricultural purposes are set forth in Law No. 26/1954. These are to be superseded in 1982 by Law No. 159/1981 but the executive regulations are yet to be released. The public-sector companies are governed by Law No. 60/1971 which was subsequently amended by Law No. 111 in 1975. A company can also be formed as a joint venture which includes foreign as well as Egyptian capital. Such a joint venture can be formed under Law No. 43/1974 and thus not be considered a public-sector company under Law No. 60/1971.

(2) Law No. 93/1962:

This law provides the basic legislation governing wastewater collection and disposal in Egypt. This law replaces three earlier laws, namely No. 35/1946, No. 96/1950 and No. 196/1953. The law describes the government's powers to provide sewers and require or restrict connections, and establishes authority over the types and quality of waste to be discharged into the sewer system. It specifies treatment and disposal standards for different effluents, most notably describing conditions under which treated wastewater can be disposed of in agricultural drains. In addition, the law outlines general rules and penalties for non-compliance with the law.

(3) Law No. 61/1963:

The law which governs public authorities is Law No. 61 of 1963. Most public authorities are established to free certain existing government services, such as public utilities, from government procedural and financial regulations. Authorities function rather independently, having separate budgets and management, but they still are subject to direction and control from the Minister to whom they report. All profits from an authority go to the public treasury while losses are supported by the state.

(4) Law No. 43/1979:

This law and its executive regulations set forth the functions of local government.

(5) Law No. 143/1981:

This law establishes the public authority called the General Authority for Reclamation Projects and Agricultural Development. This agency is in charge of all desert land affected by reclamation activities. This law abolishes Law No. 100/1964, but as yet executive regulations have not been issued.

(6) Law No. 48/1982:

This law strengthens and expands the provisions of Law No. 93/1962. It strengthens the measures aimed at protecting waterways and includes some changes in sampling and analysis procedures. It creates a special fund supplied by fines and fees to assist in the establishment of municipal and industrial wastewater treatment plants.

2. Administrative Entities Related to Environment

2.1 Ministry of Health

The Ministry of Health has several responsibilities which are particularly pertinent to the construction and operation of an improved Sharqiya wastewater system. Some of these include:

(1) Monitoring the quality of:

(a) Municipal wastewaters discharging to surface waters or agricultural land.

(b) Industrial wastewaters discharging to municipal sewers or to surface waters

(c) Surface waters (canals, drains, river) and groundwaters.

(d) Wastewater used for agricultural purposes.

(2) Advising local government of approvals for discharging wastewaters to waterways:

(3) Notifying local governments of infringement on laws dealing with wastewater.

2.2 Ministry of Irrigation

The Ministry of Irrigation has the following responsibilities, among others, that are particularly applicable to this project:

(1) Advising the Minister of Land Reclamation on irrigation and drainage regulations for desert lands.

(2) Advising local government of approvals for discharging wastewaters into waterways.

(3) Notifying local governments of infringement on laws dealing with wastewater.

(4) Supervising rural areas to ensure farmers avoid unauthorized cross-connections between canals and/or drains.

2.3 Ministry of Agriculture

The Ministry of Agriculture, under current practice, would have some specific responsibilities toward the wastewater project as outlined below:

(1) Developing and controlling operation of a farm using wastewater if it is located on non-desert land and is to be a government facility. In this case, the General Organization for Agricultural Production (GOAP) would be the agency governing operations. If desert land is utilized for crop production, GARPAD (Ministry of Reclamation) would be responsible for development and initial cultivation with the Ministry of Agriculture taking over later.

(2) Ensuring that only specific authorized crops are grown on lands irrigated with wastewater.

(3) Marketing of crops (through GOAP) to public-sector companies if a sewage farm is operated by the government.

2.4 Ministry of Finance

All funds for a public authorized are provided by the Ministry of Finance. Any excess funds or revenues are returned to the ministry.

2.5 Council of State

This government entity is responsible for giving binding opinions to government agencies on the interpretation of laws. It is the country's administrative court and is separate from the judicial system. The Council of State is responsible for resolving conflicts or disputes in laws/procedures among government agencies.

2.6 National Committee for Environment

Established by Presidential Decree in October 1980, the National Committee for Environment is responsible for formulation of the national environmental protection policy and to review and coordinate environmental protection activities. It is headed by a Secretary General who serves to coordinate activities by various standing and special committees.

2.7 Local Governments

One of the important administrative groups responsible for wastewater management and control is the local government. The principal authority in charge of sewerage, according to Law No. 93/1962, is the relevant local government unit. Several of its responsibilities are summarized below:

(1) Authorize industrial connections to public sewers.

(2) Authorize discharge of industrial and/or municipal wastewater into water courses, after consultation with and approval from the Ministries of Health, Irrigation, and Industry.

- (3) Detect and prevent unauthorized discharges to sewers, surface waters or agricultural lands.
- (4) Impose legal sanctions when violation of laws or regulations take place or carry out works at the owner's expense.
- (5) Ensure that house connections are properly installed on public sewers.
- (6) Ensure that pretreatment of industrial waste is done when needed.

2.8 National Organization for Potable Water and Sanitary Drainage (NOPWASD)

The NOPWASD was, on 7 April, 1981, initiated as a public authority which consolidates and thereby replaces all the functions of the General Organization for Potable Water and the General Organization for Sewerage and Sanitary Drainage (GOSSD). NOPWASD reports to the Ministry of Housing.

NOPWASD is responsible for formulating policies and plans for both potable water and sewerage activities at the national level. It has jurisdiction for studies, design and construction of projects outside the scope of local authorities or in areas serving more than one governorate. NOPWASD established national standards for water and sewage projects and is also responsible for training activities in the field of water and wastewater management.

2.9 Supreme Committee for Water (SWC)

The Minister of Health is responsible for providing the chairman. It is empowered to evaluate and approve from the health standpoint, projects involving potable water, treatment systems, and disposal of domestic and industrial effluents. Under the new draft law revising Law 93/1962, SWC approval is required for projects involving treatment of municipal and industrial wastewaters and disposal of wastewater to agricultural drains.

2.10 General Authority for Reclamation Projects and Agricultural Development (GARPAD)

This public authority reports to the Minister of Land Reclamation and is in charge of all desert land affected by reclamation. GARPAD would be involved during the initial stage of a development project utilizing wastewater for crop production. The authority will be responsible for providing all the necessary infrastructure for a land treatment system, even if the private sector operates the farm using sewage for irrigation; however provision of all irrigation and agricultural equipment are the responsibility of the land developer.

The GARPAD controls the price and amount of desert land that can be owned and this varies by irrigation method and type of land ownership.

Land is initially provided by GARPAD on a three-year lease basis. During this time, if the landowner makes no attempt to develop and reclaim the desert land, the land must be returned to the state.

2.11 Organization for Execution of the Greater Cairo Wastewater Project (CWO)

This agency was formed in August 1981 and is generally known as the Cairo Wastewater Organization (CWO). The organization reports to the Minister of Housing and Utilities. Its main function is planning and supervising the implementation of the Greater Cairo wastewater management project. This agency was formed specifically for this project due to its extreme magnitude and impact within Cairo and Egypt.

All activities of this agency are controlled by an Executive Committee consisting of the three affected governorates and several ministries and public authorities.

2.12 General Organization for Sanitary Drainage, Greater Cairo (GOSD)

This organization reports to the Governor of Cairo and is responsible for all sewerage works within Greater Cairo. GOSD assumes all administration, operation and maintenance activities. Construction of the project is by CWO except for minor modification and improvement works. Although GOSD reports to the Cairo Governorate, other Governorates are represented on the GOSD Board of Directors.

3. Public Health

It is needless to say that public health hazards in Sharqiya Governorate result from inadequate wastewater collection, treatment and disposal. Practically, drains for agricultural use are open to sewers in some high population density areas. And also in many lower population density areas, the residual effect derived from urban areas have rendered local groundwater unfit for direct human consumption.

Although Egypt has numerous health problems resulting from poverty, malnutrition, and intractable environmental factors, a common threat is in the existence of human waste. Human waste, either directly or indirectly, is said to be the largest single source of death and disease in Sharqiya Governorate.

One of the most severe health problems in Sharqiya Governorate is infant and child mortality. Approximately 50 percent of the total mortality occur among infants and children. About 70 children in 1,000 die before they reach their first birthday.

Diarrheas account for about 60 percent of all infant and child deaths, and these are directly related to infections arising from fecal contamination. A variety of bacterial infections, spread predominantly by food, direct ingestion from dirty hands, playing in a filthy environment, and also by water, appear to be the most prevalent source of diarrheas.

Undoubtedly, the most serious consequence of bacteria is their role in enteric infections as a serious health problem, followed in importance by protozoa and viruses. Main bacterial infections are typhoid and paratyphoid, shigellosis, and salmonellosis. Enteric infections of varied origin account for as much as 70 percent of hospital admissions, particularly among children. Within the range of prevalent enteric infections characterized by debilitating diarrheas, typhoid is one of the most important infections in Sharqiya Governorate.

There is a seasonal increase in enteric infections, as in the case of typhoid due to the greater exposure to polluted waters. In addition, during the summer months, people tend to eat more raw and uncooked seasonal vegetables.

Hepatitis and polomyelitis are severe viral diseases. Approximately 18,000 cases of infectious hepatitis were reported in Egypt in 1979. Besides, there are about 100 different viruses excreted in human feces; all are present as health hazards.

The remainder of serious water-related health problems fall in the general category of parasitic infections.

Effects of sanitation on major diseases, particularly water/sanitation related diseases, preventive measures, sources and transmission vehicles and possible effects of pathogens on effluent reuse for agricultural purpose are summarized in Tables II-1 through II-6 from the various publications.

Table II-1 Effects of Sanitation Alone on Major Disease Categories

<u>Sanitation Effects on Disease</u>	<u>Most Common Area or Form of Transmission</u>	<u>Most Effective Type of Prevention</u>
<u>Negligible</u>		
Enteric Viruses Enterobiasis Amoebiasis Giardiasis	Poor personal hygiene, frequent household/ domestic transmission because of short survival time of pathogen outside host and low infective dose necessary to produce infection.	Protected household water supply in houses, health education, workable toilets, improved housing.
<u>Slight-Moderate</u>		
Typhoid Salmonellosis Shigellosis Cholera E.Coli (Enteropathogenic) Filariasis Rift Valley Fever	Poor personal hygiene, household/domestic transmission, contaminated water supply or stagnant pools, contaminated food crops because pathogens need time to develop into infective stage.	Protected household water supply, health education, workable toilets, improved housing containment and treatment of effluent.
<u>Moderate-Great</u>		
Ascariasis Trichuriasis Hookworm Taeniasis Schistosomiasis	Ingestion of eggs from soil or direct exposure to pathogen in yards, gardens, fields, crops, primarily because pathogens need time to develop into infective stage and some must also pass through an intermediate vector.	Provision of workable toilets, treatment of excreta prior to agricultural use.

Source: Stanley Consultants, adapted from Feachem, et al.
 "Appropriate Technology for Water Supply and Sanitation",
 World Bank, 1980.

Table II-2 Relative Effects of Sanitation, Treatment and Personal Hygiene on Major Water/Sanitation Related Diseases

<u>Sanitation Measures Effective</u>	<u>Comments</u>
Typhoid Salmonellosis Shigellosis Cholera E. coli (Enteropathogenic) Schistosomiasis	Preventive measures reasonably effective in breaking cycle of transmission; main risks remain as occupational hazard, epidemics or seasonal outbreaks (mostly from increased exposure in summer months) in which poverty, congestion, and poor living conditions are equally important.
<u>Personal Hygiene More Important Than Sanitation</u>	
Enteric Viruses Enterobiasis Amoebiasis Giardiasis Balantidiasis	Important cause of infant diarrheas and mortality; health education and promotion of workable toilets essential. Most transmission occurs in household.
<u>Intensive Sewage Treatment Necessary for Removal</u>	
Ascariasis Trichuriasis Hookworm	Current problem of exposure to contaminated soil; future problem would be occupational hazard and ingestion of contaminated food crops.
<u>Prevention of Insect Access to Feces Necessary for Control</u>	
Filariasis Rift Valley Fever (Diarrheas spread by flies)	Main risk stems from inadvertent accumulation of standing pools of stagnant water and solid waste which allow for short-term breeding or extend seasonal breeding areas into year-round hazards and increase chances of exposure.

Table II-3 Major Diseases by Category/Seriousness Related to Water/Sanitation

<u>Name</u>	<u>Comments</u>
<u>Bacteria</u>	
Typhoid Dysentery (Bacillary Dysentery or Shigellosis)	Probably greatest source of enteric infection in seriousness and prevalence. Typhoid often over-diagnosed as any serious enteric infection.
Cholera	No epidemics in recent years because of strict surveillance of travelers returning from endemic area and through follow up of isolated cases. Conditions in poorer areas, however, are ripe for epidemic.
<u>Viruses</u>	
Hepatitis	Most children exposed and develop some resistance, disease milder in children, often undetected; severe illness occurs in adults who have never been exposed or lost resistance. Viruses unaffected by normal treatment and chlorination.
Enterites (diarrheas)	Increasing in importance as an urban health problem, especially in children.
Rift Valley Fever	Spread by mosquitoes which breed in slow moving contaminated water, accumulation of feces and solid waste; flight range of 10 km possible.
<u>Protozoa</u>	
Amoebic Dysenteries Giardiasis	Probably second most important source of diarrhea, especially in children; resistant to normal chlorination.
<u>Helminths</u>	
Ascariasis	Most commonly spread on food, ascars ova very resistant to mass forms of treatment and persistent in environment.
Hookworm (Ankylostomiasis)	Causes anemia, lives in soil and normally pierces feet.
Filariasis	Worm infection spread by mosquitoes as described under Rift Valley Fever.
Schistosomiasis	Spread by organism which pierce skin and are excreted by snails which prefer slow moving water as habitat.

Table II-4 Major Sources of Diarrheas/Dysenteries
Related to Sanitation

<u>Disease</u>	<u>Prime Agent</u>	<u>Normal Mode of Transportation</u>	<u>Comments</u>
Amoebiasis (Amoebic Dysentery)	Entamoeba histolytica	Food/Water	
Cholera	Vibro Cholera	Water/Food	No epidemics in recent years; conditions in poor neighborhoods ripe for epidemic, however.
Infant diarrhea Gastroententitis	Reovirus Parovirus	Unknown Unknown	Possible to build up immunity, viral infections increasing in importance in urban areas.
Giardiasis	Giardia Lamblia	Water/Food	Perhaps second greatest source of child diarrheas.
Enteritis	Strains of E. coli	Food/Water	Data seem to show increasing number of pathogenic strains of this normally nonpathogenic bacterium.
Salmonellosis (Typhoid)	Salmonella typhimurium	Food/Water	Long-term carrier state possible, appears to increase in summer from more recreational exposure.
Shigellosis (Bacillary dysentery)	Shigella sp.	Food/Water	Important because only moderate-to-low dose can cause infection.

Table II-5 Prime Sources of Transmission of Water/Sanitation Related Diseases in Cairo

<u>Current Major Diseases</u>	<u>Vehicle of Transmission</u>				<u>Source of Infection</u>	
	<u>Water</u>	<u>Food*</u>	<u>Contact</u>	<u>Vector**</u>	<u>Feces</u>	<u>Urine</u>
Amoebiasis (Amoebic Dysentery)	X	X			X	
Ascariasis		X			X	
Diarrheas, undifferentiated					X	
Dysenteries, Undifferentiated	X	X	X		X	
Giardiasis	X	X			X	
Hepatitis infectious A	X				X	X
Schistosomiasis	X		X		X	X
Shigellosis (Bacillary dysentery)	X				X	
Typhoid (Salmonellosis)	X				X	X
<u>Current Minor Diseases or Potential Epidemics</u>						
Cholera	X	X			X	
Filariasis				X	X	
Hookworm			X		X	
Rift Valley Fever				X	X	
Insect-Spread Diarrheas				X	X	

* Contact: either contact of exposed part of body to pathogen or vector or through interpersonal contact.

** Vector: predominantly insect vector.

Table II-6 Public Health Aspects of Agricultural Reuse of Treated Effluents

<u>Human Pathogen</u>	<u>Survival Times</u>			
	<u>In Soil</u>		<u>On Crops</u>	
	<u>General</u>	<u>Possible</u>	<u>General</u>	<u>Possible</u>
Viruses	Less than 3 months	Up to 6 months	Less than 1 month	Up to 2 months
Bacteria	Less than 2 months	Over 1 year	Less than 1 month	Up to 6 months
Protozoa	Less than 2 days	Up to 10 days	Less than 2 days	Up to 5 days
Helminths (ova)	Less than 2 years	Up to 7 years	Less than 1 month	Up to 5 months

Comments: Sunlight in spraying and on crops considerably reduces survival of all but helminth ova.

Source : Adapted from Feachem et al, "Appropriate Technology for Water Supply and Sanitation", World Bank, 1980.

4. Contamination in Shallow Wells along the Bahr El-Bakar Drain

Nile Delta, in which Sharqiya Governorate is located, is formed primarily by alluvial deposits. A number of people in Sharqiya use wells to supplement water withdrawn from the Nile for domestic purposes. Especially in rural areas where no distribution system is provided, groundwater is used extensively.

The groundwater system is recharged primarily from the Nile although other water sources such as canals and drains exist. Groundwater from shallow wells is generally high in iron and manganese, which can cause coloration, limiting extensive domestic use for aesthetic reasons. Some of the shallow wells in rural villages have been contaminated by inadequate wastewater disposal systems.

In the meantime, there is a large drain called the Bahr El Bakar which is connected from Cairo to Manzala Lake through the eastern Delta. According to the Report prepared by UNDP-Egypt 73/024, the total nutrient load discharging into the Manzala Lake is about 8,000 tons of nitrogen and 2,200 tons of phosphorus annually. The Bar El Bakar drain contributes wastewater originating from a part of Cairo lying to the east of the Nile which is nearly equal to 90 percent of total flow, and wastewater originating from cities of both Bilbeis and Faqus, and small towns and villages distributed along the drain. Smell from the drain is so strong that many people living along the drain want the improvement.

The suitability of the groundwater for domestic purpose is of particular importance in the Nile Delta. However, the risk of fecal contamination is very high, especially in areas along the Bahr El Bakar drain. According to the field survey conducted by Taylor Binnie in 1979, fecal contamination in Beheira and western Kafr El Sheikh is as follows:

Percent of Wells Exceeding Maximum Permissible Level

<u>Kind of Well</u>	<u>Fecal Coliform</u>	<u>Total Coliform</u>
Shallow well	42	84
Deep well	3	12.5

The situation is supposed to be the same in the Sharqiya Governorate.

APPENDIX - III

LAW NO. 48/1982 "PROTECTION OF THE RIVER NILE AND
THE WATER COURSES FROM POLLUTION" (TRANSLATED FROM
ARABIC) AND ITS REGULATIONS

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LAW NO. 48/1982 "PROTECTION OF THE RIVER NILE AND
THE WATER COURSES FROM POLLUTION" (TRANSLATED FROM
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LAW NO. 48 YEAR 1982
CONCERNING
THE PROTECTION OF RIVER NILE AND THE WATER COURSES
FROM POLLUTION

(ISSUED ON 21 JUNE, 1982)

PUBLISHED IN THE OFFICIAL PAPER
ISSUE NO. 25 (2) DATED 26 JUNE 1982

THIS TRANSLATION IS TO THE BEST OF OUR KNOWLEDGE CORRECT,
BUT IS UNOFFICIAL

LAW NO. 48/1982
CONCERNING
THE PROTECTION OF RIVER NILE AND THE WATER COURSES
FROM POLLUTION

In the name of the people
The President

The People's Assembly decided the following LAW, which we have issued:

ARTICLE NO. 1

The water courses considered in the application of the rules of this LAW are:

- (a) Surface soft water which include;
 - 1. The River Nile and its branches
 - 2. Relief canals and the canals with all its grades and the laterals.
- (b) Surface non-soft water which include:
 - 1. The drains with all its grades.
 - 2. Lakes.
 - 3. Ponds and closed surface waters and depressions.
- (c) Underground water reservoirs.

ARTICLE NO. 2

Drainage or disposal of solid, liquid, or gaseous wastes from buildings, shops, commercial, industrial or tourism establishments, is prohibited in the water courses along its whole length and surface area except after obtaining a license from the Ministry of Irrigation in the cases and in accordance with the regulations and standards which are issued by a decision of the Minister of Irrigation at the proposal of the Ministry of Health. The issued license in this matter shall include the determined special standards and specifications of each case by itself.

ARTICLE NO. 3

The departments of the Ministry of Health shall carry out in its laboratories, a periodical analysis of samples of the treated liquid wastes from the establishments licensed to discharge into the water courses, in the prescheduled times, in addition to the analysis requested by the Ministry of Irrigation not occurring in the periodical times.

The departments of the Ministry of Health shall be responsible for the sampling and its analysis on the account of the licensed party who will deposit an amount of money, to be determined in accordance with the types of wastes, to cover the costs of sampling, transportation and analysis of the samples.

The Ministry of Irrigation and the concerned party shall be informed of the results of the analysis. In case, the results show that the liquid wastes discharged into the water courses is not in accordance with the standards and the specifications listed in the issued license, and does not create an immediate danger, the concerned party shall, within three months of the date he was informed, take the necessary treatment method to the wastes, to be in accordance of the determined specifications and standards, the treatment and its tests shall be done within this period.

If the treatment is not done within the three month period, or it is proved not efficient, the Ministry of Irrigation shall withdraw the previously issued license from the concerned party and stop the discharge into the water courses by the applicable legal procedures.

If the analysis shows that the wastes are not in accordance with the standards and the specifications, in a way that create an immediate danger of pollution of the water course, the concerned party shall be informed to eliminate the causes of the interior wastes immediatly, otherwise, the Ministry of Irrigation shall do it on his account or shall withdraw his license and stop discharging into the water courses by the applicable legal procedures.

ARTICLE NO. 4

The permission of installing any establishments producing wastes discharging into water courses, is not allowed. However, the Ministry of Irrigation only, may - in the case of necessity and for the public benefit - permit the installation of these establishments if the concerned party is obliged to provide treatment units for these wastes to satisfy the specifications and standards determined within this LAW, on condition that the treatment units will be operated at the time of the operation of the establishment. The regulations governed by ARTICLE NO.3 of this LAW, are applicable for these establishments.

The already existing establishments shall be granted a one year period, from the date of the application of this LAW, to provide a treatment method for its wastes, otherwise, its license will be withdrawn. In this case, the Ministry of Irrigation shall take the necessary actions to stop the discharge into the water courses by the applicable legal procedures and without violation of the penalties inflicted in this LAW.

ARTICLE NO. 5

The owner of the residential and tourism boathouses, and others existing in the river Nile and its two branches, are obliged to provide a method of treatment of their wastes, or collection in certain containers to be evacuated and discharged into the wastewater sewers or collectors. The discharging of any wastes in the Nile or water courses is not permissible. The Irrigation Engineers responsible for the application of this LAW, each in his authority area, shall periodically inspect these boathouses. If it shows its violation of this ARTICLE, the owner shall be granted three month period to provide a method of treatment and elimination of the injurious causes. If this is not implemented within the granted period, the license of the boathouse shall be cancelled.

ARTICLE NO. 6

The Ministry of Irrigation is the responsible authority for issuing the license for installing new boathouses and for renewing the license of the existing boathouses. Also it is responsible for issuing license if any establishment producing wastes discharging into water courses.

ARTICLE NO. 7

The moving units in the river used for transportation or tourism or others, should not allow the fuel used in their operation to reach the water courses. The regulations of ARTICLE NO. 5 of this LAW are applicable on these units.

ARTICLE NO. 8

The General Organization for Sewerage and Sanitary Drainage (GOSD) shall provide a model or more of the treatment units of viscous and liquid wastes of industries, houses and other establishments and boathouses and river units to successfully satisfy the specifications and standards governed by this LAW.

ARTICLE NO. 9

The applicant for license is obliged to submit to the Ministry of Irrigation the proof of providing a waste treatment unit and a certificate from GOSD of the inspection of the treatment unit and its suitability.

ARTICLE NO. 10

When choosing and using types of chemicals and insecticides, the Ministry of Agriculture must assure that its use shall not pollute the water courses directly during the spraying, or mixed with drain waters from agricultural lands, or by washing the spraying appurtenances, tools or containers in the water courses. This shall be in accordance with the measures agreed upon between Ministries of Agriculture, Irrigation and Health.

ARTICLE NO. 11

On choosing the types of chemicals for the treatment of water weeds, the Ministry of Irrigation shall consider that its use will not pollute the water courses. In any case, the Ministry shall take the necessary precautions before, during and after the treatment process (with chemicals), not to use the water of the treated water course unless it guarantee that there is no effect of these materials on the water and its safety to be used for all purposes.

ARTICLE NO. 12

It is prohibited to reuse the waters of the drains directly or after mixing with soft waters, in any purpose unless its suitability for this purpose is proved. The Ministry of Irrigation, after taking the opinion of the Ministry of Health, shall consider treatment processes for the drain waters which are decided for reuse.

ARTICLE NO. 13

The Police of surface waters of the Ministry of Interior Affairs, shall provide continuous inspection patrols along the water courses, and shall help the specialized departments in seizing violations and eliminating the causes of pollution, and reporting on any violations of the regulations governed by this LAW.

ARTICLE NO. 14

A special account shall be initiated to collect the fees, fines and the costs resulting from the application of this LAW, from which expenditure on the following will be paid;

- The costs of the legal application procedures to eliminate violations.
- To help the parties which install treatment plants before disposal.
- For studies and scientific research.
- Bonus to the inspectors and the captors of crimes occurring by violation of this LAW.

ARTICLE NO. 15

The Executive Regulations of this law shall determine the fees required for the application of this LAW, which should not exceed the higher limits shown in the table attached to it. The Executive Regulations shall determine also the expenses entitled for the application of this LAW which may be collected by the legal procedures.

ARTICLE NO. 16

Without violation of the rules listed in the Penalties Law, the violator of the rules of ARTICLES 2, 3 (last paragraph), 4, 5, and 7 of this LAW and its executive decision shall be punished by prison for a period not exceeding one year and a fine not less than LE 500 and not more than LE 2000, or by one of these penalties. And in case of repeating the violation, the penalty shall be doubled. The violator must eliminate the violating works or make the correction in the time determined by the Ministry of Irrigation. If he did not eliminate or correct in the determined time, the Ministry shall take the elimination or correction procedures by the applicable legal procedures on the violator's account without trespassing the right of the Ministry of canceling the license.

ARTICLE NO. 17

The Ministry of Irrigation shall issue the Executive Regulations of this LAW after taking the opinion of the other concerned Ministries within three months of the date of publishing.

ARTICLE NO. 18

ARTICLES Nos. 10, 11, 12, 16 and 19 of Law No. 93/1962 concerning the disposal of liquid wastes shall be canceled. Also, every rule in conflict with the rules of this LAW shall be canceled.

ARTICLE NO. 19

The Irrigation Engineers, identified by the decision issued by the Ministry of Justice with the agreement of the Ministry of Irrigation, shall bear the authority of Captors Officers in respect of the crimes listed in this LAW and which lies in their area of authority.

ARTICLE NO. 20

This LAW to be published in the official paper and to be applicable after three months of the published date.

Stamp this LAW by the Nation Seal, and to be executed as one of its Laws.

Issued at the Presidency on 29 Shaaban 1402 (21 June 1982)

Signed by
(HOSNI MOBARAK)

THE MINISTER OF IRRIGATION'S DECREE NO.8
DATED 17 JANUARY,1983
OF THE EXECUTIVE REGULATIONS OF LAW 48/1982
(PUBLISHED ON THE OFFICIAL PAPER ISSUE NO.31)
(DATED 5/2/1983)

Decree No. 8/1983
The Executive Regulations of LAW 48/1982
Concerning the Protection of River Nile and
the Water Courses from Pollution

The Minister of Irrigation

Reference to the LAW NO. 93/1962 Concerning the disposal of liquid wastes.

LAW NO. 38/1967 Concerning general cleanliness.

LAW NO. 74/1971 Concerning irrigation and drainage.

LAW NO. 48/1982 Concerning the protection of River Nile and water courses from pollution.

and to the President Decree No. 653/1980 concerning the rearrangement of the Ministry of Irrigation and pursuant to the opinion of the State Council.

Decreed

PART ONE

GLOSSARY

ARTICLE NO. 1

In the application of the mentioned LAW 48/1982, the water courses shall mean the following :

1. The River Nile and its two Branches :

The main stream of the Nile starting from the international border with Sudan down to influxes of Rosetta and Damietta Branches into the Mediterranean Sea.

2. Creeks :

Side branches of the River Nile within the Islands.

3. Relief Canals :

The main canals transporting water from the upstream of Delta Barrages and which feed the canal system in Lower Egypt.

4. Canals :

The large and small canals with its all branches till the field irrigation streams.

5. Parallells :

The distributing canals parallel or the bypass which feeds from the main delivery canals transporting irrigation waters.

6. Drains :

The large and small drains with all its branches up to the field and the sub-surface drains.

7. Lakes :

Lakes connected to the sea or the closed lakes.

8. Ponds :

Large closed surface waters into which the water courses discharge.

9. Closed surface water :

Depression filled with water and connected to water courses.

10. Depressions :

Low lands around the lakes into which drains discharge.

(Note : The source of the water of the last three water courses is from drains).

11. Underground water reservoirs :

All the underground water reservoirs within the Egyptian Borders.

The Solid Wastes mean all solid wastes whether resulting from refuse or garbage in septic or dry condition, crushed stones, construction or workshops refuse, or any solid wastes generated from individuals, or residential and non-residential buildings, private or governmental, whether it is commercial, industrial, tourism or public, and also solid wastes from the means of transportation.

The liquid wastes means :

1. Wastes generated from industries on which the special standards of liquid industrial wastes are applicable.
2. Human and animal wastes generated from the wastewater treatment plants, and the collection systems from buildings and other establishments of the individual, public, commercial, industrial or tourism purposes, whether it is fixed, moving or floating establishment.
3. Liquid animal wastes generated from slaughter houses and chicken farms, barns and others.

The establishments mean all buildings and shops and installations whether commercial, industrial, tourism, governmental or non-governmental.

PART TWO
THE LICENSE TO DISCHARGE TREATED LIQUID WASTES
INTO WATER COURSES

ARTICLE NO. 2

It is prohibited to use the banks of surface waters, whatever is its type, as place to collect or dispose of or to transport or to store solid wastes subject to drip or to volatile except in the places licensed by the Ministry of Irrigation upon the application submitted by the concerned party.

ARTICLE NO. 3

It is prohibited to store or unload chemical or poisonous materials on the banks of the water courses except in the previously licensed places, with respect to the present valid licenses. The renewal of these licenses and new licenses shall be obtained from the Ministry of Irrigation.

ARTICLE NO. 4

The liquid industrial wastes, licensed to be discharged into water courses, must not contain any chemical insecticides, radio-active materials, any materials which may float in the water courses, or any material which may cause injury to human beings, animals, plants, fish or birds, or may affect its suitability as potable water or for its domestic, industrial and agricultural use.

ARTICLE NO. 5

It is prohibited to license the disposal of any human or animal wastes or the sanitary wastes into the soft surface waters listed in ARTICLE No. 1 of the LAW 48/1982 or into the underground water reservoirs.

ARTICLE NO. 6

It is prohibited to discharge all the liquid industrial wastes or the sanitary wastewaters into soft surface waters and the underground water reservoirs. The Ministry of Irrigation may issue a license to discharge liquid industrial wastes, which have been treated, into underground water reservoirs in accordance with the provisions, specifications and standards determined by this Executive Regulations.

ARTICLE NO. 7

It is prohibited to license the disposal of machine cooling waters into water courses except if this water have been taken from the same stream in which it is discharging or at least from a similar source with respect to the type of water. On condition that the cooling circuit is closed and not mixed with any wastes of any operation of the industrial operations or other, conformity with the specification and standards of discharging industrial wastes into the soft or non-soft water courses, is not required, except for the temperature and the oil and grease provisions.

ARTICLE NO. 8

It is prohibited to discharge any waters containing radio-active materials into the underground water reservoirs.

ARTICLE NO. 9

The pipe discharging treated liquid wastes, which are licensed to be disposed of into water courses, shall be in an apparent position and higher than the highest water level of the stream.

ARTICLE NO. 10

In case of discharging treated liquid industrial waste by license it is conditioned that the outfall pipe should be at least three kilometers upstream water supply intakes or one kilometer downstream.

ARTICLE NO. 11

The backwash waters of the filters of the water purification plants must not be discharged into water courses without treatment. The concerned parties have to provide the suitable treatment method.

ARTICLE NO. 12

The application for obtaining license to discharge treated wastewater into water courses, shall be submitted to the chief Irrigation Engineer of the district related to the Ministry of Irrigation in which the establishment is located. The application shall be stamp paid and include the following information:

1. The name, location and address of the establishment.
2. The license issued for the existing establishments, the number and date of the license application and the approvals issued in its favour.
3. The name of the owner of the establishment.
4. The activity of the establishment.
5. The type of liquid wastes required to be licensed for disposal into water courses.
6. Laboratory analysis results which were carried out within three month period of a sample of these wastes (in case of existing establishments).
7. The name of the nearby water course proposed for receiving the discharge of the establishment.
8. The engineering drawings showing the locations of the discharging points into water courses or to the underground water reservoirs and the proposed discharging method and the necessary technical specifications.
9. Payment of LE 20 as a consideration fee.

10. Payment of a deposit sum to cover the costs of sampling transportation and analysis is as follows:

Types of Wastes	Deposit value (LE)
1. Sanitary wastewaters	200.00
2. Liquid industrial wastes	
a. Discharging into soft surface water	500.00
b. Discharging into non-soft surface water	400.00

ARTICLE NO. 13

The Irrigation Engineer, within the area of his authority the establishment is located, shall carry on the inspection and the required technical studies.

ARTICLE NO. 14

The responsible Irrigation Engineer have to consult with the Ministry of Health regarding the results of the analysis of the liquid wastes under investigation to determine its conformity with the standards of this Regulations.

ARTICLE NO. 15

The Ministry of Health shall take a sample, or samples, of the treated wastes, at any time, and report to the Ministry of Irrigation with the analysis results accompanied by the opinion of the Ministry of Health Laboratories on the form mentioned in ARTICLE No. 26 of this Regulations.

ARTICLE NO. 16

The license is issued by the Director General of the General Administration of Irrigation according to the actual inspection and the results of the analysis.

ARTICLE NO. 17

The issued license shall contain the following :

- The number of the license.
- The name of the establishment and its location.
- The name of the owner of the establishment.
- The standards and the special specifications limits which should not be transcended by the licensed liquid waste type.
- The name and location of the water course receiving the liquid wastes.
- The volume of the licensed liquid waste (m³ /d)
- The number and locations of the licensed discharging points.
- The duration of the license.
- The annual fees required to cover the laboratory examination and sample analysis expenses.

ARTICLE NO. 18

The license period must not exceed two years and must be renewed at least two month before its expiration date. The license shall be canceled if not renewed before its expiration date.

ARTICLE NO. 19

The following departments shall be informed by a copy of the issued license :

1. The concerned General Administration of Irrigation.
2. The applicant.
3. The General Administration of Environmental Health of the Ministry of Health.
4. The police of the surface waters, the Ministry of Interior Affairs.

ARTICLE NO. 20

In case of not approving the license application, the Ministry of Irrigation shall inform the applicant by a registered letter containing the reasons of rejection, within sixty days from the date of the submission of the application. The applicant has the right to complain within 15 days from the date he was informed of the license rejection.

ARTICLE NO. 21

The reasons of complain shall be submitted to the same department which received the application, and this department have to study and reach a conclusion within 30 days from receiving the complain. Its opinion shall be final.

ARTICLE NO. 22

The penalties listed in LAW 48/1982 are applicable on those who violate the provisions of the issued license.

ARTICLE NO. 23

In case that the license is lost or damaged, the General Administration of Irrigation, which issued the license, must be immediately informed, in order to obtain a substitute after paying a fee of LE 10.

PART THREE

THE CONTROL OF THE LICENSE PROVISIONS ENFORCEMENT

ARTICLE NO. 24

The Ministry of Health shall carry out in its laboratories, at least once every three month, a periodical analysis of samples from the treated wastes of the licensed establishments discharging into water courses mentioned in the LAW 48/1982. Sampling will be carried out in different times to identify the type of wastes with accuracy.

ARTICLE NO. 25

The Ministry of Irrigation may ask the Ministry of Health to take samples from the treated liquid wastes at times chosen by the Ministry of Irrigation and not during the periodical sampling times mentioned in the previous ARTICLE. The Ministry of Health shall inform the requesting party of the results of the analysis of these samples accompanied by the opinion of its Laboratories.

ARTICLE NO. 26

The Ministry of Health shall inform the Ministry of Irrigation and the owner of the establishment of the results of the analysis of the sample taken from the treated liquid wastes within one month from the date of the sampling on a form including the following:

1. The name of the establishment and its address.
2. The date and location of sampling.
3. The time of sampling (hr).
4. The name and the address of the laboratory of the Ministry of Health which carried out the analysis.

5. The title of the sampling person.
6. The title of the laboratory responsible person.
7. The detailed analysis results, in comparison with the per-scheduled standards.
8. The final opinion of the laboratory.

ARTICLE NO. 27

If the results of the analysis show its violation to the standards and the specifications scheduled in the license, in a way that creates immediate danger of polluting the water courses, the Ministry of Irrigation shall notify the concerned party, by any means, to eliminate the pollution danger immediately, otherwise, the Ministry of Irrigation will carry out the work on his behalf. In this case, the license may be withdrawn and the disposal into the water courses may be stopped by the applicable legal procedures, and the police department and the concerned governorate authorities shall be notified for the execution.

ARTICLE NO. 28

If the results of the analysis of the samples taken from the treated liquid wastes, show its violation to the standards and the specifications scheduled in the license, in a way that does not create immediate danger, the Ministry of Irrigation shall notify the concerned party to eliminate the violation causes within three months from the date he was notified.

The concerned party is considered knowledgeable of the notification from the date of receiving it or from the date of receiving the results of the analysis from the Ministry of Health. The earliest date shall be considered.

ARTICLE NO. 29

The Ministry of Irrigation shall notify the Ministry of Health with the actions taken in accordance with the previous ARTICLE, to consider taking a new sample in the day following the completion of the three month period mentioned in the previous ARTICLE. The Ministry of Health shall analyse and report back to the Ministry of Irrigation with the results of the analysis and the final opinion of the Ministry of Health on the form mentioned in ARTICLE No. 26 of this Regulations.

ARTICLE NO. 30

The Ministry of Irrigation shall withdraw the license and stop the disposal into water courses by the applicable legal procedures if the treatment is not done within the three month period mentioned in ARTICLE No. 28, or if the results of the repeated analysis showed that the treatment carried out by the concerned party is insufficient.

ARTICLE NO. 31

The owners of the permanent or temporary existing establishments which generate wastes discharging into water course are obliged to notify the Ministry of Irrigation within three month period from the date of the application of this Regulations, with the following data :

1. The name of the establishment and its address.
2. The name of the owner or the ownership administration.
3. The activity of the establishment.
4. The license for the installation of the establishment.
5. The type of waste discharging into water courses.

6. The name of the water course receiving this waste.
7. The license granted to the establishment to dispose of its wastes into water courses, if any.
8. The volume of the liquid wastes authorized to be disposed of into the water course.

The notification shall be accomplished by a registered letter or by hand delivery against a receipt to the Irrigation Engineer, within the area of his authority the establishment is located.

ARTICLE NO. 32

The Ministry of Irrigation shall initiate files in the Engineering Departments of the Markaz (Town) level. These files shall contain the information about the permanent and the temporary establishments licensed in accordance with the application mentioned in the LAW 48/1982.

ARTICLE NO. 33

The Ministry of Irrigation shall review the submitted notifications conforming with ARTICLE No. 31, concerning the present existing establishment and the status of their liquid wastes disposed of into water courses. Also it shall carry out the necessary inspections of these liquid wastes of these establishments, and comment with its observations on every site, and have to send a copy of these findings to the Ministry of Health in order to take samples from the liquid wastes and analyse them. The time of sampling shall be decided by the Ministry of Health.

ARTICLE NO. 34

The Ministry of Health shall notify the requesting Department of the Ministry of Irrigation and the owner of the establishment of the analysis results accompanied by the final opinion of the Laboratory of the Ministry of Health concerning these wastes.

ARTICLE NO. 35

The owner of the establishment, within one year from the date of application mentioned in the LAW 48/1982, shall provide a method of treatment to the liquid wastes in order to eliminate its violation to the determined standards and specifications.

ARTICLE NO. 36

At the end of the granted period mentioned in the previous ARTICLE, the Ministry of Health shall carry out a new analysis from samples of the treated liquid wastes from all the existing establishments which have been notified, in accordance with ARTICLE No. 33 of this Regulations.

The Ministry of Health have to notify the Ministry of Irrigation and the owners of the establishments of the results of the analysis and the opinion of the Ministry of Health Laboratories concerning these wastes.

ARTICLE NO. 37

The Ministry of Irrigation shall withdraw the license and stop the discharge into water courses by the applicable legal procedures, without violation of the penalties listed in the LAW 48/1982, if it is proved, after completion of the granted period mentioned in ARTICLE No. 35 of this Regulations, that the work accomplished by the owner of the establishment for the treatment of the liquid wastes, is unsuitable.

ARTICLE NO. 38

From the date of the application of the LAW 48/1982, it is not permissible for the concerned State Departments or the Governorate Departments to issue license of installing any establishments generating wastes discharging into the water course.

The Ministry of Irrigation is the sole and only authority responsible for issuing the final license for installing establishments generating wastes disposed of into water courses, after the concerned party have obtained the approvals of other concerned Departments and his obligation of providing treatment units for the liquid wastes, which will assure the compliance with the standards and specifications listed in this Regulations.

PART FOUR
BOATHOUSES AND RIVER MOVING UNITS

CHAPTER ONE
BOATHOUSES

ARTICLE NO. 39

In the application of the rules of ARTICLE No. 5 of LAW 48/1982, the boathouses mean every existing establishment, mechanically or not mechanically operated, whether it is residential or tourism or else.

ARTICLE NO. 40

From the date of the application of the LAW 48/1982, the Ministry of Irrigation shall be responsible for issuing the license of installing new boathouses and for renewing the license of the existing boathouses, after the concerned party obtains the approvals from the other juridical departments.

ARTICLE NO. 41

The application for obtaining license of installing boathouses shall be submitted by its owner to the Head of the Irrigation Section of the Ministry of Irrigation in Cairo, stamp paid and the following documents to be attached.

1. The ownership document of the boathouse.
2. A certificate from the General Organization of the River Transportation proving the suitability of the boathouse and its conformity with the Organization technical specifications.
3. A certificate from the General Organization for Sewerage and Sanitary Drainage (GOSD) proving its inspection and the suitability of the provided wastes treatment unit.
4. The approvals of the other Juridical Departments.

5. A promissory note from the owner that he will not allow leakage of the used operating fuel to reach the water courses.
6. The name of the water course used for navigation or docking
7. Payment of a considering fee of LE 20.

ARTICLE NO. 42

The license shall be issued by the responsible Irrigation Director General or by the Nile Inspector, as the case demands, within one month from the date of the application. The license shall include the following :

- The name of the boathouse.
- The name of the owner of the boathouse.
- The activity of the boathouse.
- The promissory obligation of the owner not to allow the fuel used in its operation to reach the water courses.
- The validity period of the boathouse license as follows :
 1. Three years for residential boathouses.
 2. One year for tourism boathouses.

ARTICLE NO. 43

The application for the renewing of the license should be submitted, after fulfillment of the requirements mentioned in ARTICLE No. 41 of this Regulations, to the Department of the Ministry of Irrigation which issued the license, within three months before the expiration date of the license.

ARTICLE NO. 44

In case that the license is lost or damaged, the General Administration of Irrigation or the Nile Inspector who issued the license must be immediately informed, in order to issue a substitute after receiving a fee of LE 10.

ARTICLE NO. 45

The Ministry of Irrigation Department have to inspect periodically, at least once every month, and whenever it is necessary, the boathouses docking within the boundaries of the Engineering Irrigation Markaz, to assure its compliance with the provisions of the issued license, and to provide the method of treatment of its wastes, or collecting in special containers and disposing of in the sewers or collectors of sanitary drainage. The Ministry of Irrigation shall notify the owners of the boathouse by a registered letter to eliminate the causes of violation within three months of the date of receiving this note.

ARTICLE NO. 46

The responsible Irrigation Engineer or the Nile Inspector shall re-inspect the boathouse at the end of the three month period mentioned in the previous ARTICLE No. 43. If the re-inspection shows the unsuitability of what have been done by the owner for the treatment in order to eliminate the causes of violation, the license of the boathouse shall be canceled.

ARTICLE NO. 47

The Ministry of Irrigation shall initiate files at the Irrigation Engineering Markaz and the Nile Inspection Department, in which all the information listed in the license of each boathouse docking or on duty in the water course within its authority area, are recorded.

ARTICLE NO. 48

All the owners of the existing boathouses, whatever the reason of its use, have to inform the Ministry of Irrigation, on the day of the application of this Regulations, of the following information:

- The name of the boathouse.
- The name of the owner or the ownership administration.
- The activity of the boathouse.
- The issued license of the installation of the boathouse.
- The name of the water course licensed to be used by the boathouse.
- The type of wastes generated by the boathouse and the way of disposal.
- The availability of waste treatment units before disposal.
- The license issued to the boathouse to discharge into water courses, if any.

This notification should be sent by a registered letter or handed against a receipt by the responsible Irrigation Engineer of the Markaz or to the Nile Inspector in whose area of authority the boathouse lies, within three months of the date of the application of this Regulations.

ARTICLE NO. 49

The Ministry of Irrigation shall review the information submitted by the owners of the existing boathouses, at the time of the application of the LAW 48/1982. The boathouse and method of treatment and disposal of the wastes shall be inspected. The Ministry of Irrigation shall report on each boathouse and send a copy of the information to the Ministry of Health and to GOSD in order to report back to the Ministry of Irrigation by their final opinion.

CHAPTER TWO
THE RIVER UNITS

ARTICLE NO. 50

On the application of the rules of ARTICLE No. 7 of the LAW 48/1982, the river moving unit means every floating establishment which is mechanically operated, even if it consists of two units, one pulling the other, or one pushing the other and whatever is the purpose of its use.

ARTICLE NO. 51

The rules of ARTICLE No. 39 through 49 of this Regulations are applicable on the river moving units except that the validity period of the license shall be three years.

ARTICLE NO. 52

The police of the surface waters of the Ministry of Interior Affairs shall be responsible for capturing the boathouses or the river units which discharge its wastes into water courses and those which are leaking fuel, and for writing the necessary reports and notifying the Irrigation Engineer or the Nile Inspector within whose area of authority the boathouse or the river unit lies, in order to take the necessary actions in accordance with the LAW. Also they are required to inspect periodically and suddenly the boathouses and the river units in the docks and to take the necessary actions.

ARTICLE NO. 53

The Ministry of Irrigation may notify the police of the surface waters in order to capture the violators and write the required report and to notify the concerned authorities of the Ministry of Irrigation to apply the rules of the LAW.

ARTICLE NO. 54

The Ministry of Irrigation may notify the Ministry of Health in order to take samples from liquid wastes discharged by the establishment into the water courses, and to analyse and to notify the requesting party of the Ministry of Irrigation of the results of the analysis accompanied by the opinion of the laboratories of the Ministry of Health concerning these results.

PART FIVE
SAMPLING AND ANALYZING

ARTICLE NO. 55

The representatives of the Ministries of Irrigation and Health and GOSD, have the right to enter the buildings, shops, commercial, industrial and tourism establishments and the wastewater treatment plants and other places which discharge its wastes in the surface waters, in order to take samples, and to visit periodically or not periodically to inspect the method of disposing of the liquid wastes and the treatment units to be sure of its efficiency and to discover the violators.

The owner of the establishment have to provide the required facilities and help the inspectors complete their mission successfully.

ARTICLE NO. 56

The volume of the sample shall not be less than two liters. Sampling shall be in bottles with cover which closes perfectly. The inside of the bottle and the cover shall be properly cleaned before use. In the case of sampling from wastes treated with chlorine, the bottles shall be sterilized.

ARTICLE NO. 57

The analysis shall be carried out in the laboratories of the Ministry of Health immediatly after sampling. If this is not possible, and the required analysis shall be delayed for a period more than three hours, the samples must be kept in an ice box and surrounding the bottle with ice, in order that the sample reach the laboratory surrounded with some ice.

ARTICLE NO. 58

The sample must be representative, as close as possible, of the nature of the liquid wastes, and shall be taken from a suitable location at the effluent of the treatment process or at the discharging point in the water course. If there are several outfalls in the same establishment, a separate samples should be taken at each outfall. The bottle should be completely filled and the stopper should be firmly placed after sampling. Air or gaseous bubbles, or unfilled portions are not allowed between the surface of the sample and the stopper.

During sampling, the opening of the bottle shall be in the opposite direction of the flow. Sampling shall not be from the top or from the bottom. After filling the bottle it should be wrapped with cloth and sealed with red wax, or equal, and signed by the sampler.

ARTICLE NO. 59

The person responsible for sampling has to fill carefully and with clear writing the special form and should have the signature of the concerned person or his representative on the form. Also he has to send the sample immediately to the Ministry of Health Central Laboratory in Cairo or the local laboratories in the Governorates.

PART SIX
THE LIMITS, STANDARDS, AND SPECIAL SPECIFICATIONS
FOR
DISCHARGING TREATED LIQUID WASTES INTO WATER COURSES

FIRST: DISCHARGING INTO SURFACE SOFT WATERS

ARTICLE NO. 60

The soft water courses licensed to receive treated industrial liquid wastes, must remain within the following standards and specifications.

Description	Standards and Specifications in mg/l (unless otherwise mentioned)
Color	not more than 100 degrees
Total Dissolved Solids	500
Temperature	5 degrees (C) over the normal
Dissolved Oxygen	not less than 5
pH	not less than 7 and not more than 8.5
BOD	not more than 6
COD	not more than 10
Organic Nitrogen	not more than 1
Ammonia	not more than 0.5
Oil and Grease	not more than 0.1
Total Alkalinity	not more than 150 and not less than 20
Sulphates	not more than 200
Mercury Compounds	not more than 0.001
Iron	not more than 1.0
Manganese	not more than 0.5
Copper	not more than 1.0
Zinc	not more than 1.0
Detergents	not more than 0.5
Nitrates	not more than 4.5
Fluoride	not more than 0.5
Phenol	not more than 0.02
Cadmium	not more than 0.01
Chrome	not more than 0.05
Cyanide	not more than 0.1
Lead	not more than 0.05
Arsenic	not more than 0.05

ARTICLE NO. 61

The standards for license which have been issued by the Ministry of Health to discharge treated liquid industrial wastes into soft surface water and into underground water reservoirs are :

(Note : All units are in mg/l unless otherwise mentioned)

Description	The higher limits of the treated liquid industrial wastes which are discharged into:	
	The River Nile from the southern borders of Egypt to Delta Barrage.	The Branches of the Nile and the relief canals, canals, parallels and the underground water reservoirs.
Temperature	35°C	35°C
pH	6-9	6-9
Color	free from coloring materials	free from coloring materials
BOD	30	20
COD (dichromate)	40	30
COD (permanganate)	15	10
Total Dissolved Solids	1200	800
Ashes of Dissolved Solids	1100	700
Suspended Solids	30	30
Ashes of Suspended Solids	20	20
Sulphides	1.0	1.0
Oil, Grease and Resins	5	5
Phosphates (inorganic)	1	1
Nitrates (N36)	30	30
Phenol	0.002	0.001
Fluorides	0.5	0.5
Residual Chlorine	1	1
Total Heavy Metals (include)	1	1
Mercury	0.001	0.001
Lead	0.05	0.05
Cadmium	0.01	0.01
Arsenic	0.05	0.05
Copper	1	1
Nickel	0.1	0.1
Iron	1.0	1.0
Magnesium	0.5	0.5
Zinc	1	1
Silver	0.05	0.05
Detergents	0.05	0.05
MPN of E-Coli	2500/100cc	1500/100 cc

ARTICLE NO. 62

The Ministry of Irrigation, without violation of ARTICLE No. 60 of this Regulations, may supersede some of these standards in the previous ARTICLE, in the cases when the volume of the treated liquid industrial wastes discharged into soft water courses is less than 100 m³/day on condition that it should not exceed the limits shown in the following table:

Description	The maximum limits of the treated industrial liquid wastes to be discharged into:	
	The River Nile from the Southern borders to the Delta Barrages.	The Nile Branch and the relief canals, canals, parallels and the underground water reservoirs
BOD	40	30
COD (dichromate)	60	40
COD (permanganate)	20	15
Total Dissolved Solids	1500	1000
Ashes of Total Dissolved Solids	1000	900
Suspended Solids	40	30
Oils, Grease and Resins	10	10
Nitrates	40	30
Phenol	0.005	0.002

ARTICLE NO. 63

The treated liquid industrial waste licensed to be disposed of into soft surface waters, shall not be mixed with human or animal wastes.

ARTICLE NO. 64

In the application of the rules of the LAW 48/1982, the rules which govern the regulations of the special standards of radiation or radio-active materials are applied to assure the conformity of the liquid industrial waste with it, before issuing the license of discharging these wastes into soft surface waters.

ARTICLE NO. 65

Before lifting to the soft water surfaces, the drain waters should be as follows :

Description	Standards (mg/l unless otherwise mentioned)
Color	not more than 100 units
Total Solids	500
Temperature	5°C above normal
Odor	2 degrees (cold)
Dissolved Oxygen	not less than 5
pH	not less than 7 and not more than 8.5
BOD	not more than 10
COD (dichromate)	not more than 15
COD (permanganate)	not more than 6
Ammonia	not more than 0.5
Oil and Grease	not more than 1.0
Total Alkalinity	not more than 2000 and not less than 50
Mercury Compounds	not more than 0.001
Iron	not more than 1.0
Magnesium	not more than 1.5
Copper	not more than 1.0
Zink	not more than 1.0
Detergents	not more than 0.5
Nitrates	not more than 45
Fluorides	not more than 0.5
Phenol	not more than 0.02
Arsenic	not more than 0.05
Cadmium	not more than 0.01
Chrome (6)	not more than 0.01
Cyanide	not more than 0.1
Phosphates	1.0
Carbon Extracts	1.5
MPN E-Coli	5000/100 cc

ARTICLE NO. 66

The properties of the sanitary wastewaters and industrial liquid wastes to be licensed to discharge into non-soft surface waters should conform with the following standards and specificatins :

Description	Maximum limit of standards and Specifications (mg/l)	
	Sanitary wastewaters	Industrial liquid wastes
Temperature	35°C	35°C
pH	6 - 9	6 - 9
BOD	60	60
COD (dichromate)	80	100
COD (permanganate)	40	50
Dissolved Oxygen	not less than 4	-
Oil and Grease	10	10
Suspended Solids	50	60
Coloring Materials	nil	nil
Sulphides	1	1
Cyanide	-	0.1
Phosphates	-	1.0
Nitrates	50	40
Fluorides	-	0.5
Phenol	-	0.005
Total Heavy Metals	1	1
Insecticides (All types)	nil	nil
MPN E.Coli	5000/100 cc	5000/100 cc

ARTICLE NO. 67

In case of discharging sanitary wastewaters or industrial liquid wastes mixed with sanitary wastewater, into non-soft surface waters, the discharged wastes should, on the request of the concerned Health Department, be treated with chlorine before disposing of. The residual chlorine after 20 minutes contact period shall be not less than 0.5 ppm. Also, the equipment and disinfecting material shall be available and ready to be used for this treatment all the times, upon request.

ARTICLE NO. 68

The non-soft surface waters licensed to receive treated liquid wastes must remain within the following standards and specifications :

Description	Standards and Specifications
Temperature	not more than 5°C above normal average
Dissolved Oxygen	not less than 4 ppm at any time
pH	not less than 7 and not more than 8.5
Detergents	not more than 0.5 ppm
Phenol	not more than 0.005 ppm
Turbidity	not more than 50 units
Dissolved Solids	not more than 650 ppm
MPN E-Coli	5000/100 cc

ARTICLE NO. 69

In case of disposing liquid wastes into lakes, it should be considered that the MPN of E-Coli should not exceed 70/100 cc in the fisheries and not more than 130/100 cc in 1/10 of the samples taken from the lake in the fishing season, in order to protect the fisheries wealth and the fish from wastes pollution.

PART SEVEN

THE SPECIAL CASHBOX OF THE COLLECTED FEES AND FINES

ARTICLE NO. 70

In accordance with the rules of ARTICLE No. 14 of LAW 48/1982, a special cashbox shall be initiated in the Ministry of Irrigation and to have a special account in the Central Bank of Egypt under the name of "The Special Cashbox of the fee and fines of Law 48/1982 concerning the protection of the River Nile and the water courses from pollution."

ARTICLE NO. 71

The fees and fines and the expenses related to the application of LAW 48/1982 should be collected in the mentioned cashbox.

ARTICLE NO. 72

The Board of the Cashbox shall be formed by a decree of the Minister of Irrigation and should meet at least once per month.

ARTICLE NO. 73

The Board shall be responsible of planning the policy of the Cashbox, following its actions and establishing the systems and the procedures necessary for its implementation.

ARTICLE NO. 74

The balance of the Cashbox shall be prepared including the collected incomes and the ways of expenditures and submitted to the Board before the beginning of the fiscal year in a sufficient time to be approved by the Minister of Irrigation.

At the end of the fiscal year, the final account of the Cashbox should be prepared in order to be approved by the Board and to be ready for presentation to the Accounting Department of the Central Accounting Organization.

ARTICLE NO. 75

The Board of the Cashbox shall issue its procedures and regulations without binding itself to the government systems and regulations. The issued regulations shall be approved by the Minister of Irrigation.

ARTICLE NO. 76

The incomes of the Cashbox shall be as follows :

- a. The fees of the licenses and the special insurances of any establishments producing wastes discharging into water courses.
- b. The fees of the licenses and the special insurance of the boathouses and the new river units and the renewing of licenses of the existing boathouses and river units.
- c. The values of violations and the fines listed in ARTICLE No. 16, of the LAW 48/1982.
- d. Other incomes collected by the application of the rules of the LAW 48/1982.
- e. The credits and the subsidies provided by the State to support the incomes of the Cashbox.
- f. Grants, offers and commitments accepted by the Minister of Irrigation.

ARTICLE NO. 77

The expenditures from the incomes of the Cashbox shall be in accordance with the regulations issued by the Board. The expenditures include especially the following :

1. The cost of the administrative eliminations of the violations.

2. The cost to help the departments installing treatment plants before their final disposal.
3. The cost of studies, research and laboratory analysis.
4. The bonus paid to the employees for their extraordinary efforts in the operations of the capture and the elimination of violations.
5. Bonus to the guides and to those who seize the crimes occurring in violation of the LAW 48/1982.
6. The periodical laborers needed to eliminate the violations or for any other work required by the application of the LAW 48/1982.

ARTICLE NO. 78

The Department of the Ministry of Irrigation shall collect these fees and merits and put them in the special account of the Cashbox. The fees and the expenditures which are required for the application of this LAW, can be collected also by the applicable legal procedures.

ARTICLE NO. 79

The Board of the Cashbox shall determine the bonus of the guides and those who capture the crimes, as a percentage of the value of the collected fine, also the board shall determine the minimum and the maximum of the bonus and its payment regulations.

ARTICLE NO. 80

The parties licensed to discharge their treated liquid wastes into water courses, shall be notified during July of every year by a list showing the money required for the fees, analysis, expenditures, fines and the cost of elimination of violations and others which are made within the year.

PART EIGHT
GENERAL RULES

ARTICLE NO. 81

The owners of the establishments licensed to discharge their treated liquid wastes into water courses are obliged to deposit an insurance sum of LE 2000 in special Cashbox of the Ministry of Irrigation upon a receipt, in order to assure the implementation of the rules of ARTICLE No. 16 of the LAW 48/1982. Deductions from this deposit shall be the values of fees and the cost of eliminations which will be applied for violations, when the violator does not pay the fees and the cost of elimination. The owners are obliged also to recomplete the value of the permanent deposit within two month of the date of deduction by the value of the appointed fine and the cost of the elimination.

The receipt of the permanent deposit shall be considered one of the required documents for obtaining or renewing the license.

ARTICLE NO. 82

The annual fee required to use the water courses is 5 milliems for one meter cube of treated liquid wastes licensed to be disposed of in the water course.

The collected monies of these fees shall be put in the special Cashbox of the Ministry of Irrigation.

ARTICLE NO. 83

This Decree shall be published in the official paper and to be applied from the date of publishing.

The Minister of Irrigation
Eng. Mohamed A. Samaha

APPENDIX - IV
WATER QUALITY SURVEY

APPENDIX - IV

WATER QUALITY SURVEY

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1. Introduction

As an integral part of the study, water quality analyses to obtain water qualities of various kinds of waters such as drain, sewage and wells were conducted twice during the first and the second on-site survey periods, the first from August to September, 1987, and the second in January, 1988. Sampling points representing each of the waters were selected, samples were taken and some quality items were measured on the spot by the study team members and analysis of the other items were conducted by a government laboratory.

Purposes of the water quality survey for each category of the waters are:

- To evaluate the water quality of the drains in the Governorate, in which raw sewage or treatment plant effluent from the major cities are discharged.
- To obtain water quality of raw sewage to develop design basis for the treatment facilities.
- To investigate water quality of the shallow wells to determine possible contamination caused by the existing sewage disposal systems.
- To investigate water quality of the effluent from the existing treatment facilities to evaluate the operation of the plant.

Water samples were taken from the selected points which were considered representative of the conditions of each category of waters in the Governorate.

2. First Analysis

The first water quality analysis was conducted from 27th August to 3rd September, 1987, at selected locations in the Governorate.

2.1 Sampling Points

(1) Drains

Five sampling points were selected in the drains which receive wastewaters from five major cities, namely Zagazig, Bilbeis, Minyet El Qamh, Abu Kebir and Faqus. Water samples were drawn from the center section of the drains by using a bucket fixed to a rope.

(2) Raw Sewage and Treated Effluent

Five raw sewage samples were collected from the wet wells of the pumping stations in the sewerage systems of the same five cities mentioned above. In addition, one sample from the existing sewage treatment plant in Zagazig was taken and analysed.

(3) Shallow Wells

Three well water samples were taken from the shallow wells of three locations in undeveloped area in Zagazig City, in rural areas of Zagazig and Minyet El Qamh Markaz. These areas are not served by the sewerage systems and sewages are disposed of mostly by transhes.

Locations of the total of 14 sampling points mentioned above are tabulated in Table IV-1 and depicted in Figures IV-1 through IV-7.

Table IV-1 Location of Sampling Points

No.	Location	Category of Water
1.	Zagazig city	effluent of wastewater treatment plant
2.	- ditto -	raw sewage
3.	- ditto -	shallow well water
4.	Bilbeis city	drain water (discharge point)
5.	- ditto -	raw sewage
6.	Minyet El Qamh city	drain water (discharge point)
7.	- ditto -	raw sewage
8.	Abu Kebir city	drain water (discharge point)
9.	- ditto -	raw sewage
10.	Faqus city	drain water (discharge point)
11.	- ditto -	drain water (Bahrel El Bakar Drain)
12.	- ditto -	raw sewage
13.	Tahlet Bordien Village, Zagazig Markaz	shallow well water
14.	Bany Korish Village, Minyet El Qamh Markaz	shallow well water



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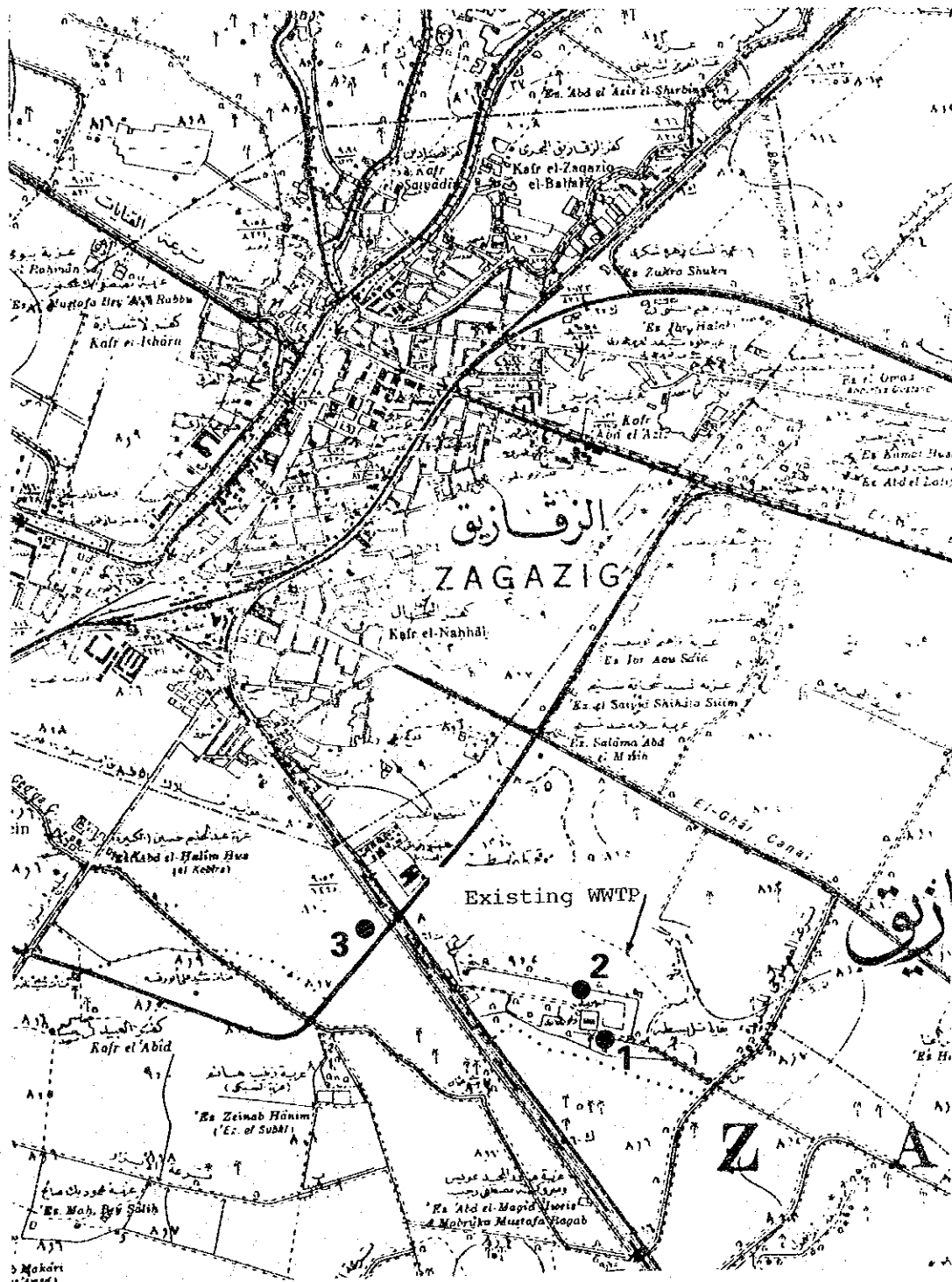


Figure IV-1 Location of the Sampling Points in Zagazig City



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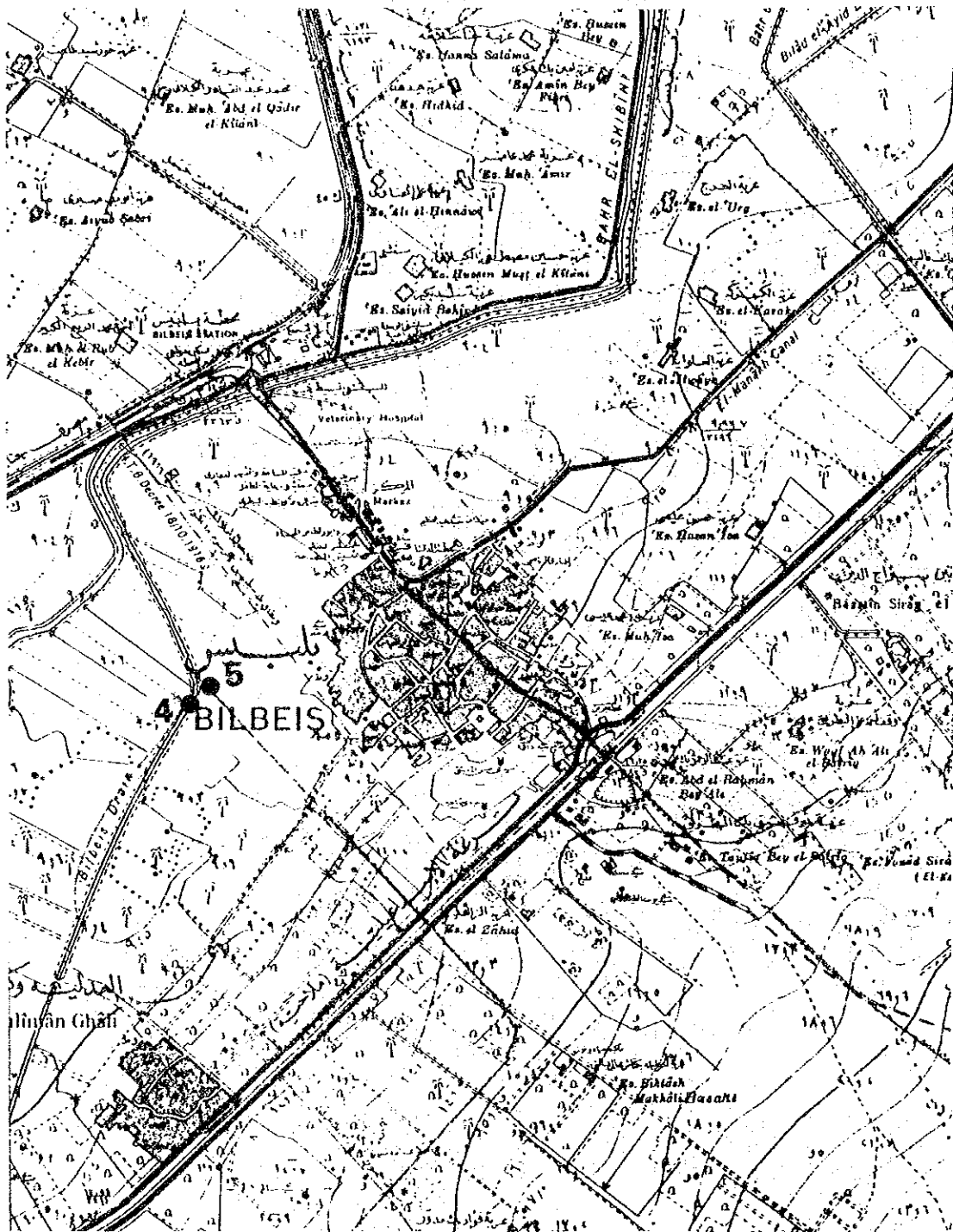


Figure IV-2 Location of the Sampling Points in Bilbeis City



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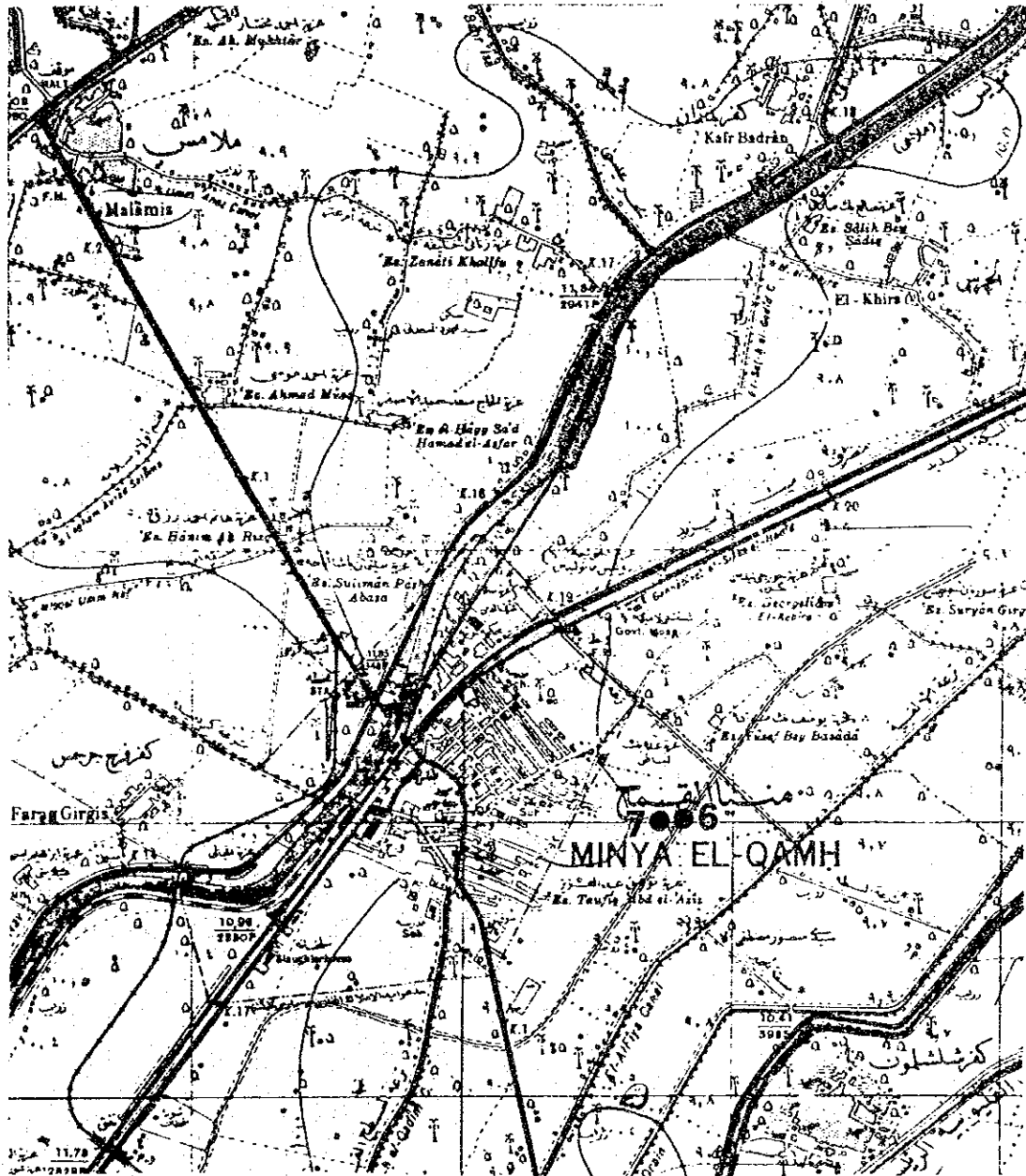


Figure IV-3 Location of the Sampling Points in Minyet El Qamh City



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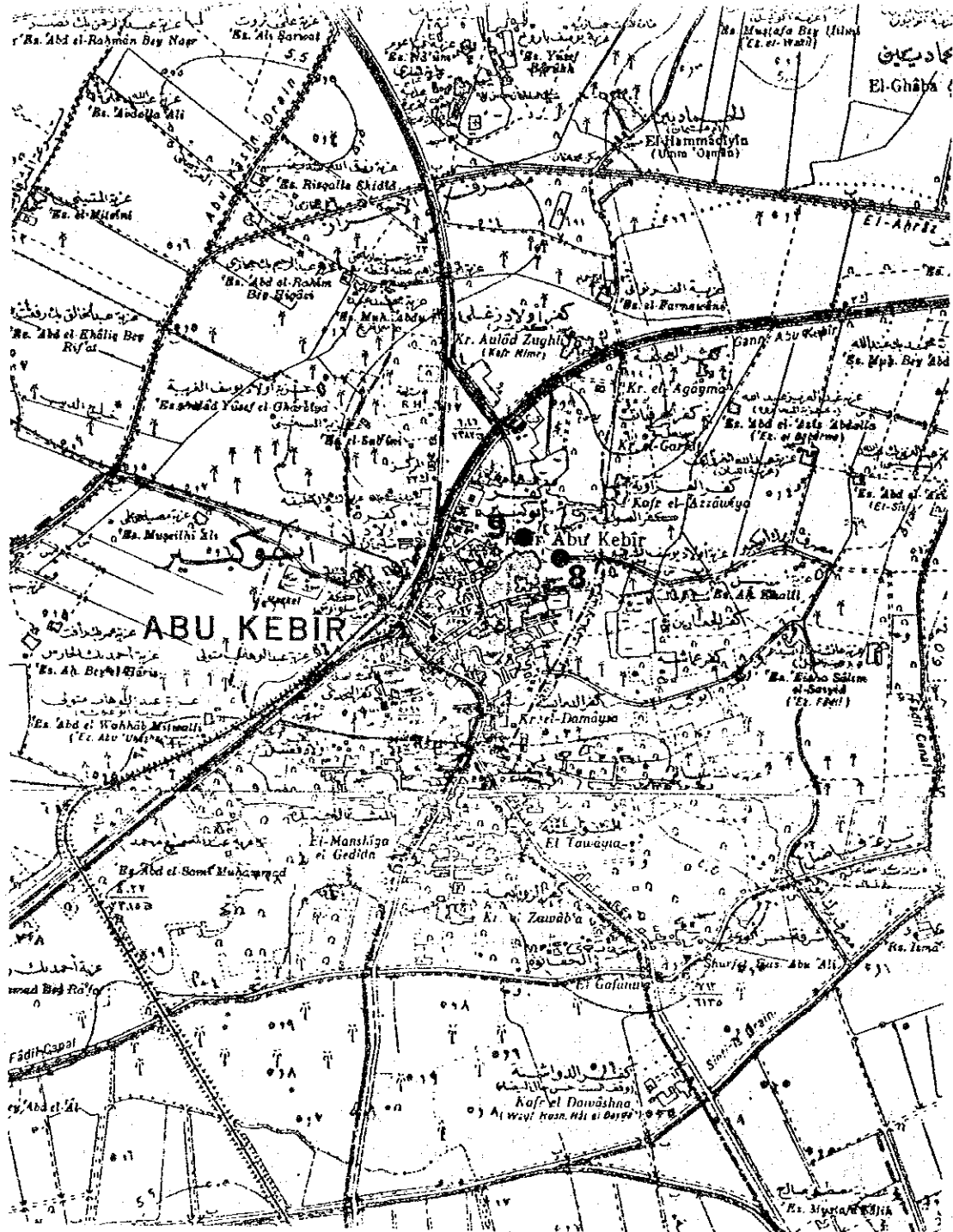


Figure IV-4 Location of the Sampling Points in Abu Kebir City

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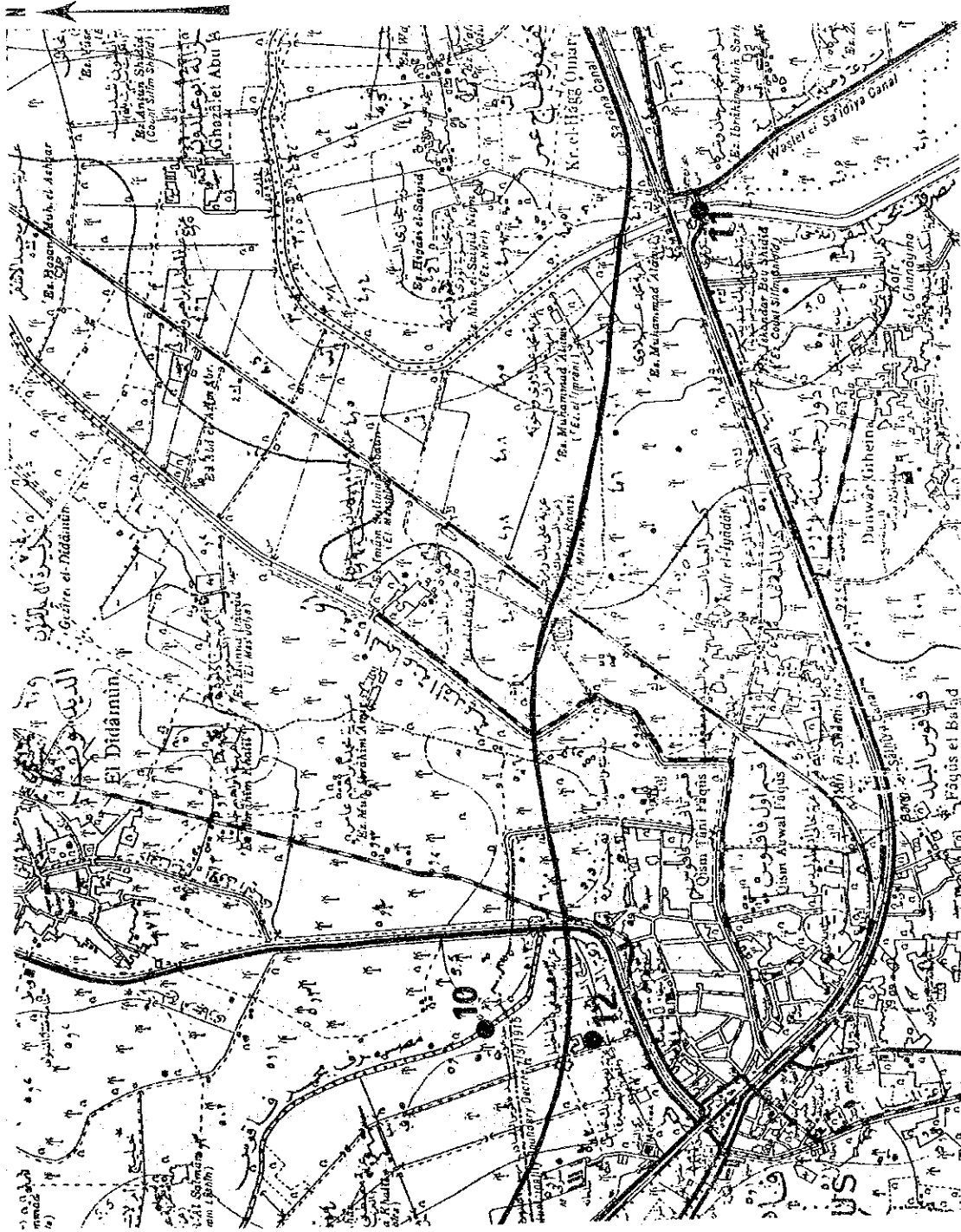


Figure IV-5 Location of the Sampling Points in Faqus City

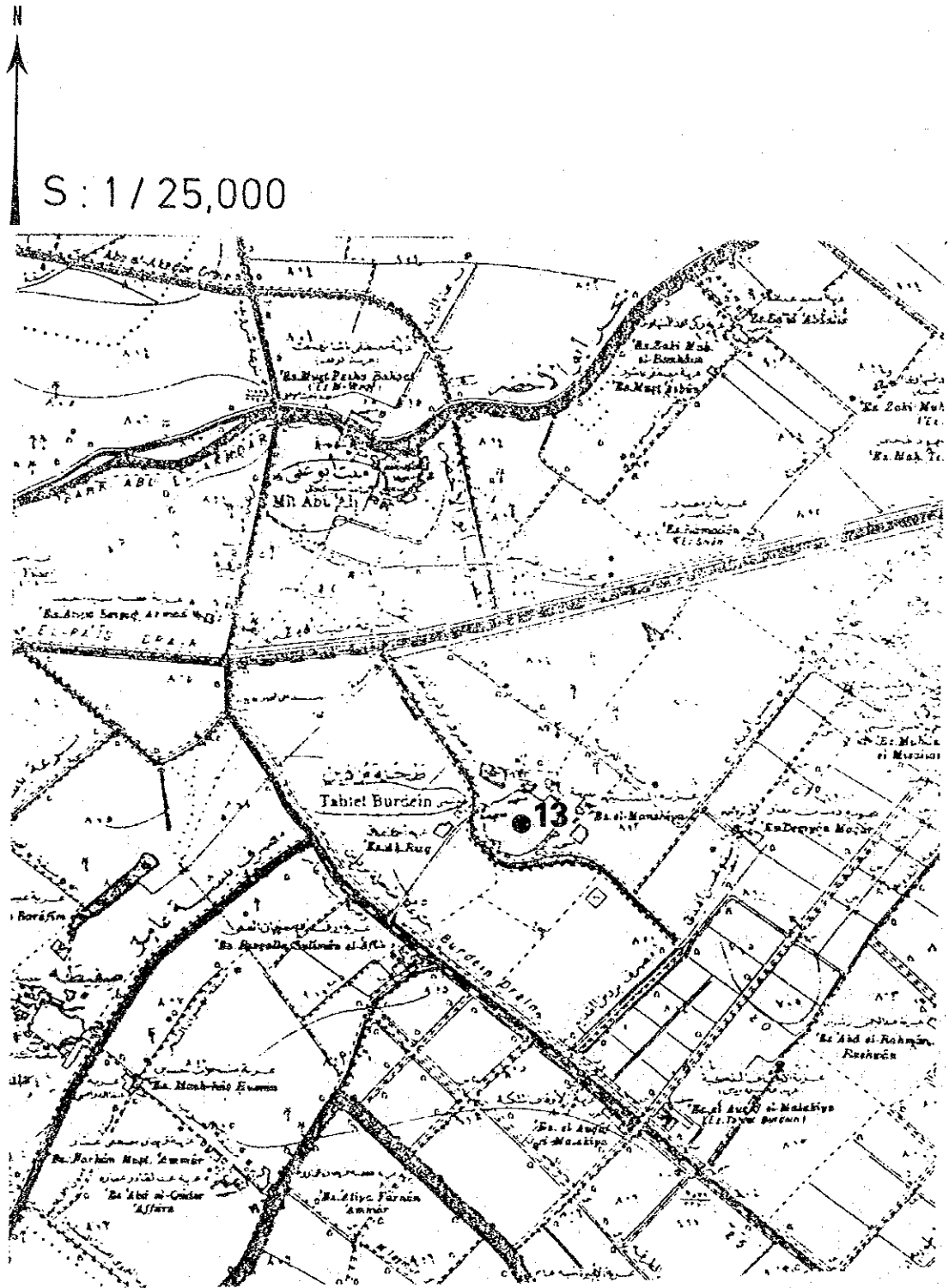


Figure IV-6 Location of the Sampling Points in
Tahlet Bordien Village, Zagazig Markaz



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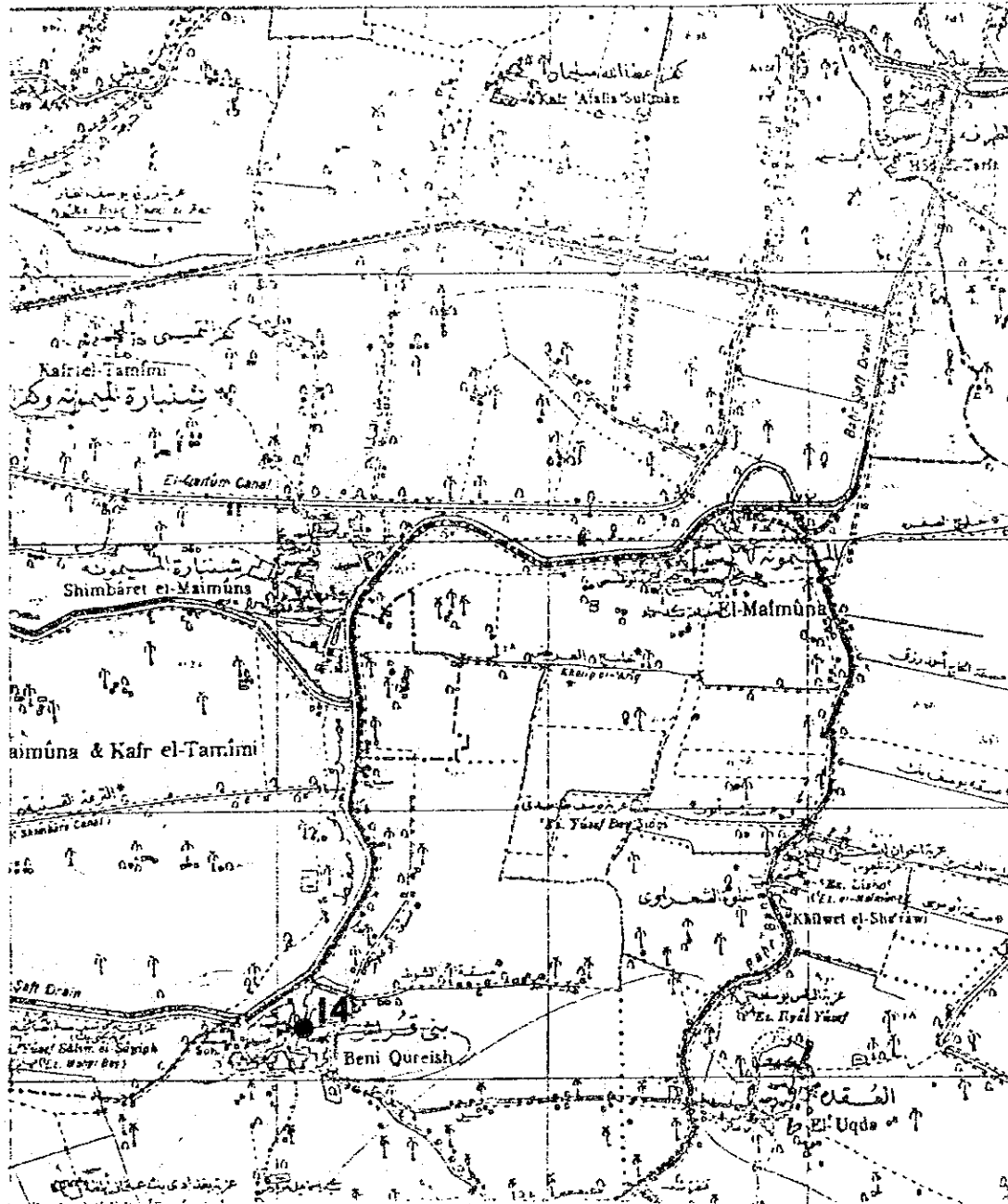


Figure IV-7 Location of the Sampling Points in
Bany Korish Village, Minyet El Qamh Markaz

2.2 Water Quality Items Analysed

Some of the water quality items which need immediate analysis were measured by the study team members on the spot. These are water temperature, appearance, dissolved oxygen (DO), and so on. Other quality items as BOD, COD and SS which require analysis in the laboratory were brought to the Cental Laboratory of the Ministry of Health in Cairo. Results were obtained from the laboratory. Water quality items of specific concern vary according to the type or category of the water body and purpose of the analysis. Accordingly, items below mentioned were selected and analysed.

2.2.1 Items Analysed on the Spot (common to all samples)

- (1) Water Temperature (°C)
- (2) Air Temperature (°C)
- (3) Appearance (suspended materials, scum, oil, odor, color)
- (4) Transparency (cm)
- (5) pH
- (6) Conductivity (s/cm)
- (7) Dissolved Oxygen (DO) (mg/l)

2.2.2 Items Analysed by the Laboratory in Raw Sewage and Treated Effluent

- (1) Suspended Solids (SS) (mg/l)
- (2) Biochemical Oxygen Demand (BOD) (mg/l)
- (3) Chemical Oxygen Demand (COD-Mn) (mg/l)
- (4) Alkalinity as CaCO₃ (mg/l)
- (5) Chloride (mg/l)
- (6) Ammonia Nitrogen (NH₄-N) (mg/l)
- (7) Total Phosphorus (mg/l)
- (8) Total Coliforms (MPN/100 ml)
- (9) Faecal Coliforms (MPN/100 ml)