WATER AND WASTEWATER SECTOR ASSESSMENT

USAID/CAIRO

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MAIN REPORT
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LIST OF ABBREVIATIONS

AID	-	The Agency for International Development of which USAID/Cairo is one overseas mission.
A/GOSD	-	Alexandria General Organization for Sanitary Drainage.
AWGA	-	Alexandria Water General Authority.
Bab	-	A chapter or section of the GOE budget: Bab 1 = salaries and wages; Bab 2 = other current operating expenses; Bab 3 = capital investment.
BVI-ATK	-	Black and Veatch International in association with A.T.Kearny, consultants.
CAOA	-	Central Agency for Organization and Administration.
C/GOSD	-	Cairo General Organization for Sanitary Drainage.
DRPS	-	USAID Division of Development Resources and Program Support.
GDP	-	Gross Demestic Product.
GOE	-	Government of Egypt.
GOGCWS	-	General Organization for Greater Cairo Water Supply.
GOPW	-	General Organization for Potable Water.
GOSSD	-	General Organization for Sewerage and Sanitary Drainage.
LE	-	Egyptian Pounds.
NOPWASD	-	National Organization for Potable Water and Sanitary Drainage.
PAAD	-	Program Assistance Authorization Document.
SCA	-	Suez Canal Authority.
UAD	-	Urban Administration and Development.
USAID/Cairo	-	The United States Agency for International Development in Cairo, A.R.E.

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LIST OF ABBREVIATIONS

EXECUTIVE SUMMARY

A. Background

Water and wastewater services in Egypt's major urban complexes are woefully inadequate. After years of neglect, failures in the systems are constant. Most of the present systems were designed to handle water demands and wastewater loads of less than one-half of that which they now face. Despite adequate levels of water production, water shortages exist in many areas due to distribution system problems. Rapidly urbanizing areas, particularly on the growing peripheries of Cairo and Alexandria, develop far ahead of the ability of service facilities to catch up. Poor pressure and high leakage in the existing systems result in a very low quality of service and growing consumer dissatisfaction. However, on the wastewater side, the issues are even more pressing and acute. Wastewater systems are incapable of handling current flows. As many as 500 flooding incidents occur each day in Cairo alone. These incidents pose severe health risks and major inconveniences to local residents.

The present water and wastewater system deficiencies will only grow worse unless concerted effort is brought to bear on the problems. Cairo, Alexandria and to a somewhat lesser degree, the Canal cities, will experience major population increases over the coming decades as the country as a whole becomes predominantely urban. Increasing numbers of persons will require and demand water and wastewater services from systems that already are seriously inadequate.

Over the past five years, USAID has obligated $146.8 million for the water sub-sector and $242 million for the wastewater sub-sector of which only slightly more than 25% has been expended to date. Greater Cairo received about half of the total obligated funds and Alexandria and the Canal Cities each received one quarter.

During this same time period, the GOE expended nearly 6% of its total investment, or 1.3% of its GDP, in the water/wastewater area. From 1977 to the end of FY 1982, the GOE spent LE 505 million in the water sub-sector and LE 457 million in the wastewater sub-sector. By the beginning of FY 1983, it was budgeting LE 77 million for operations and maintenance in the water and wastewater sector.

The 1983-1987 Five Year Plan, only recently approved, calls for a 250% spending increase over the 1977-82 investment program, or a total investment of LE 3.4 billion. This represents a substantial shift in investment priorities. The sector will claim 2.7% of total GDP generated by 1987. The greatest percentage of total investments, over 60%, will go to Cairo, Alexandria and the three Canal cities, excluding the Suez Canal Authority investments in the water sub-sector. Of this amount, the largest investments will go to the wastewater sub-sector, with Cairo receiving LE 1.1 billion; Alexandria, LE 300 million; and the Canal Cities, LE 101 million. Foreign assistance over the 1983-87 period will be in addition to the GOE commitments. AID has pledged to seek authorization of an additional $1 billion and it is anticipated that other donors will contribute the equivalent of approximately $180 million over the same time period.

B. Sector Constraints

The huge planned GOE investments in the sector, as well as the expected substantial increase in foreign donor assistance, raise many questions of absorbtive capaity. Not only will the capacity of the Egyptian construction sector be stretched beyond present capacity but also local material production will not be able to meet the sudden surge in demand for pipe, fittings and related materials, and equipment. Foreign construction contractors and material suppliers will have to provide much of the new material and construction services for system improvements and enlargements. The foreign exchange demand in the sector will likewise increase.

In addition to these material and construction capacity constraints, there are a number of other more far-reaching problems which may not lend themselves to easy resolution. The present system suffers from a series of institutional, financial and operational constraints and obstacles.

Institutionally the sector lacks direction. There is no overall set of coherent goals and aims. Water and wastewater organizations and authorities are poorly coordinated. Chairmen of authorities and their Board of Directors have little fiscal control over their organizations, i.e. they cannot set water or wastewater tariff rates and are completely dependent upon central authorities for their operating and investment budgets. They do not have sufficient internal management authority to reorganize their operation as may be appropriate,

nor do they have sufficient control over employee wages and bonus incentive schemes. Moreover, the authority that does exist, often rests with the Chairman alone. Little authority is delegated to line and staff personnel in water or wastewater organizations.

Financially the sector is beset by numerous difficulties. To date, GOE expenditures have been far below system needs particularly in the area of operation and maintenance. Moreover, the operation and maintenance needs in the sector necessitated by the current five-year investment plan will call for a fourfold increase in operating expenditures over present levels. Without substantial improvements in the capacity of sector organizations to generate revenue, the entire system will become more and more dependent upon government subsidies during a period of shrinking central capacity to provide such subsidies. Revenue generation in the sector will depend almost completely upon the amount of water sold and the applicable tarrif rate, since wastewater services will depend on a surcharge which can be added on water tariffs. Currently the water/wastewater tariff schedules are grossly deficient and fall far short of paying for the operation and maintenance of even the water sub-sector. Wastewater tariffs are non-existent.

Operationally the sector is performing inadequately. Water flows are irregular and insufficient in many areas and constant wastewater flooding exists in many areas as well. The reasons for the sub-standard level of performance are many, including underfunding of the system, lack of proper operation and

maintenance, as well as inadequate numbers of professional and skilled workers. The sector is unable to attract and retain the numbers of professional staff and skilled workders needed. Severe shortages of experienced and competent personnel, particularly skilled and semi-skilled workers in the wastewater sub-sector, severely limit the ability of the system to respond to daily problems and to provide the level of maintenance needed. Inadequate personnel policies, including low wages and benefits, lack of bonus and promotion schemes tied to merit, and/or additional skill attainment through training, contribute to limiting the number and quality of key staff in the sector.

C. USAID Sector Program

The proposed USAID program design recognizes that the sector is beset with numerous organizational, financial and operational constraints. Moreover, it realizes that there are strong and often conflicting forces within the GOE which on the one hand wish to improve the delivery of services, yet on the other hand wish improvements to be accomplished without substantially increasing the cost of service to consumers. Inherent in the GOE's position is the belief that without major material improvements to the existing systems, additional charges would be politically destabilizing.

Consequently, the proposed Sector Program seeks on the one hand to address the constraints, and GOE conerns, and on the other hand to build upon new GOE initiatives in the sector. The proposed USAID program specifically targets inputs for investments as well as institutional support, management assistance, and training.

1. Investment Strategy

The proposed Sector Program concentrates on further support for Cairo, Alexandria and the Canal Cities, where we have already funded master plans for water and wastewater system development and are funding major capital projects. Our efforts should concentrate on investments that will provide immediate and visible improvements in service to consumers, particularly in the wastewater sub-sector. The investment program seeks to meet projected requirements for the year 2000. It aims to reduce the incidence of wastewater flooding in areas already overloaded or badly deteriorated and will extend wastewater collection systems into unsewered areas that presently are experiencing flooding problems.

Our capital investments should be phased and prioritized to produce the maximum level of relief to flooded areas. Priority should be given to construction projects for which land has been acquired and on which construction can start and be completed quickly. All means of reducing project completion time should be jointly examined with the GOE; including the use of turnkey (design-build) contracting wherever possible. We

should not invest in new primary or secondary treatment plants at this time. Rather, investments should focus on improvements and extensions of collection networks. We should also limit our investments in water systems to those that will not further exacerbate wastewater problems. Water system investments should concentrate on commodity support and management assitance to operations and maintenance in order to help reduce water wastage and leakage, which contribute to flooding.

AID's sector investment program should be structured to allow maximum flexibility to shift funds among various sector activities through the use of a sector Program Assistance Authorization Document (PAAD). All existing AID water and wastewater projects should be merged within three program activity funds identified by project wherever possible: (1) project design and supervision, (2) project implementation and commodity support, and (3) management assistance and training.

Initially the money in each fund will be based upon current USAID obligations and sub-obligations. New money will be obligated for each of these funds based on the anticipated level of sub-obligation required by each fund over a 12-month period. The proposed funding structure indicates future additional obligations of $587.7 million for Alexandria Wastewater, $670 million for Cairo Wastewater, $11.5 million for Cairo water, and $87 million for the Canal cities. In addition, $50 million should be obligated for operation/maintenance commodity support and general management assistance.

2. Institutional Support and Technical Assistance Strategy

From an institutional and organizational perspective, USAID should seek to support the necessary changes and modifications that will be necessary to bring about a higher level of efficiency in system operations. These changes should also strengthen the sector's ability to obtain increased revenues through tariff rates covering the cost of operation, maintenance and debt service for future capital investments in the system.

Over the next five-year period , USAID should seek water tariff increases that cover operation, maintenance and debt service. It should also seek action by GOE to reduce the volume of unsold water production to 15% by 1987. A wastewater surcharge should also be added gradually to the water tariffs. The surcharge should be sufficient to cover 50% of operation, maintenance and routine annual improvement costs of the wastewater system by 1987 and to cover 100% by 1992.

In order to meet these targets, several institutional, organizational and operational changes are needed. The various sector organizations need to vastly improve their capacity to generate revenue through user charges and to retain the revenues they collect. At present the sector organizations have little incentive to undertake the difficult and unpopular steps of raising added revenues through higher user charges and

in collecting the tariff charges. USAID should support technical/management assistance to the sector organizations to help them improve their management, operation and maintenance functions, including water meter installation, reading, billing and servicing.

There is a need to develop local autonomous organizations responsible for investments and operation-maintenance activities in the sector. There is also the need to develop at the national level a policy-setting body to give the sector overall direction and guidance and to provide technical and training assistance. USAID should support these institutional and organizational needs through technical/management assistance to strengthen the National Organization for Potable Water and Sanitary Drainage (NOPWASD). NOPWASD would be charged with establishing sector policies at the national level, to coordinate sector funding, providing engineering support to governorate level sector organizations, and to providing comprehensive manpower planning and training services in the sector on a regional level.

In addition, through the proposed Joint Sector Steering Group and Joint Sector Executive Committee, the GOE and USAID should move toward developing autonomous public water companies for Cairo and Alexandria and the Suez Canal Area. The Steering Group and Executive Committee should also reorganize some of the existing wastewater authorities to provide greater local autonomy and decision making. Technical assistance should also given NOPWASD to explore ways of improving the solid waste

collection efforts in Cairo, Alexandria and in the Canal cities. These investigations should seek ways of preventing sewer blockage, improving solid waste management systems, and integrating new collection technologies with traditional approaches.

Furthermore, given the manpower and skills needed in the sector, USAID should support a NOPWASD examination of the overall training needs in the sector. This examination should identify professional and technical needs by organization and by geographic area, and develop a strategy to meet these training needs. It should also indicate the financial resources required, and develop a phased program to provide training.

Finally, USAID has learned from its past involvement in the sector that covenants to loan agreements, particularly regarding tariff rate changes, tend to be ignored. Consequently, our program to commit funds needs to be carefully crafted. It should take into consideration the present constraints in the sector and the tariff increases necessary between 1983 and 1987 to support the operation and maintenance of the system. Substantive action on the part of the GOE to achieve tarrif increases and promote institutional change should be a condition precedent to obligation of USAID funds for the sector. Progress targets in these areas should be negotiated within the USAID-GOE Joint Sector Steering Group, and become the basis for scheduling the obligation of AID funds.

INTRODUCTION:

This report presents the findings of the USAID Water and Wastewater Sector Assessment for Egypt. The assessment was conducted by a team composed of USAID/Cairo and AID/Washington staff, supplemented by Egyptian and American consultants, during the period January through March 1983.[1] The objectives of the assessment were to examine the current problems in the provision of water and wastewater services in Greater Cairo, Alexandria and the three Suez Canal cities of Imsailia, Port Said and Suez; identify the constraints which have caused the current problems; recommend measures to alleviate these constraints; and propose a USAID Sector Development Program which would support the GOE's efforts to improve water and wastewater services in the target cities.

At the request of the GOE, AID has agreed to seek authorization to allocate $1 billion to the Egyptian water and wastewater sector during the period FY 1983 - FY 1987. These allocations will be drawn from the current level of U.S. economic assistance to Egypt which amounts to $1 billion per year. The assessment is designed to provide a basis for programming these funds, and a base line for future annual sector reviews. Such sector reviews would guide the AID sector development program as the needs of the GOE for sector assistance evolve.

1. The assessment team members were:

   Mr. David Painter, Project Officer, DRPS/UAD
   Dr. Peter Amato, Urban and Regional Advisor, DPPE/PAAD
   Dr. William Fox, Public Finance Specialist, NE/TECH
   Dr. Nabil Saba, Sanitary Engineer, DRPS/UAD
   Dr. Ibrahim Omar, Public Administration Consultant
   Dr. Metwalli El Sayed, Financial Consultant
   Mr. Robert McGarry, Utilities Management Consultant

This report is arranged as follows: an executive summary provides an overview of the assessment findings and recommendations. Following this introduction, Section 1 summarizes the current situation in the Egyptian water and wastewater sector. Section 2 identifies the sector constraints and recommends various actions to alleviate these constraints under seven main headings: sector investment plans; revenue generation; sector organizational arrangements; USAID organizational arrangements; project planning, design, and implementation; operation and maintenance of systems; and manpower and training. Section 3 presents the proposed USAID sector development program including its geographic and technical rationale, its structure, and the steps required to implement the program. A separate volume of annexes provide additional information and analyses in support of the assessment findings and recommendations.

1. CURRENT SITUATION

Rapid urbanization in Egypt has produced water distribution problems in the country's major metropolitan areas. Moreover, the wastewater disposal system, original designed for much lower volumes of wastewater conveyance, are almost constantly surcharged which results in flooding in many sections of Cairo, Alexandria and the Canal Cities. This poses serious health risks to residents of affected areas. Both USAID and the GOE has made major commitments to water and wastewater activities over the past five years and continue to struggle with the most effective organizational and institutional arrangements to meet the growing water/wastewater crisis. This section provides an overview of the current and projected urban population situation, present service levels and public health considerations of water shortages and wastewater system flooding. It also outlines the current organizations and sector financing which have been established by both the GOE and USAID to meet sector needs.

1.1 Population and Urbanization

As of April 1980, Egypt contained 42 million inhabitants and it is expected to reach 68 million by the year 2000. The largest percentage increase will be registered in urban places. In 1907, the country's urban population was only 19 percent. By 1947 it rose to 33 percent urban, and by 1976 it stood at 44 percent. As of April 1980, it was approximately 50 percent urban, and by the year 2000 it is projected to reach 55 percent urban.

These projections indicate the need for substantial and continuing investments in urban water and wastewater services over the next 20 year period. The National Urban Policy Study (NUPS), has concluded that the major metropolitan regions of Cairo and Alexandria will and should play a major role in absorbing Egypt's urban population increase over the next few decades. The Cairo Region will accomodate the greatest share of the expected urban population (43 percent) in the year 2000. It will reach a population of approximately 16 to 16.5 million inhabitants. The Alexandria Zone has the greatest potential to compete with the Cairo area for urban immigrants. The Alexandria Sewerage Master Plan projections and the NUPS have indicated a projected year 2000 population for Alexandira of 5 to 5.5 million inhabitants.

Although the Canal cities have benefited from reconstruction efforts since the end of hostilities, they have fallen far short of their growth objectives with the possible exception of Suez. Over time, the locational advantages of these cities with respect to the Suez Canal and to the Delta, will ensure their future urban growth. Each of the cities differ in terms of their development potential. The NUPS projections to the year 2000 are as follows:

Suez 750-850,000 (5.8-6.4% growth rate per year);
Ismailia 400-500,000 (3.1-4.1% growth rate per year);
Port Said 550-650,000 (3.1-3.85% growth rate per year).

(See Annex A for more detailed urban population projections)

1.2 Present Service Levels

Rapid urban population growth, espcially in Cairo and Alexandria, has lead to water problems coupled with inadequate wastewater disposal in densely populated city centers, and little or no access to these services in peripheral urban areas. Intermittent water supply, poor pressure, and frequent sewage flooding incidents are common. Many industries have developed their own sources of water supply and wastewater disposal which in some cases are detrimental to the general environment. (See Annex B for descriptions of current water and wastewater systems.)

The estimated water production capacity in the five urban areas covered by this Assessment is nominally sufficient to provide an average of 275 l/c/d for all purposes. Of this, about 18% is unaccounted for due to leakage, so that about 226 l/c/d is available for use. Approximately another 22% of total water production is wasted due to faulty plumbing and broken standpipes. Thus actual water use may be as low as 110 l/c/d in some areas. Other Middle Eastern cities with similar climatic and developmental charactristics have water supplies of 140 l/c/d or more available for use. Thus there is no overall shortage of water in Cairo, Alexandria and the Canal Cities. However, these averages conceal a wide variation in the water supply characteristics of these cities. Cairo and Port Said are the best served while Ismailia and Suez are the least well served. Alexandria service is strained each summer by the massive influx of vacationers. But the real water problem in these cities is not water production. Rather the problem is poor distribution service stemming from old and inadequate distribtuion networks.

Despite the general adequancy of the water supply in Egypt's major cities, their wastewater disposal systems are completely incapable of handle the current wastewater flows. In Greater Cairo alone there are as many as 500 wastewater flooding incidents every day. Similar situations prevail in Alexandria and the Canal Cities. Wastewater systems are generally confined to the central areas of these cities. Their peripheries rely an individual sewage holding tanks which must be cleaned out periodically at their owners expense.

Existing wastewater systems are dangerously overloaded and in a poor state of repair. The recent failure of a major wastewater forcemain in Giza provided a graphic example of the kind of disaster that could occur at my moment in Egypt's major cities. Such disasters could have serious public health consequences, but even the current operation of these systems contributes to an unsanitary urban environment of serious proportions.

1.3 Public Health

Water-related diseases such as infectious hepatitus, typhoid and para-typhoid, as well as dysentery, are increasing throughout Egypt. And although the cause and effect relationship between inadequate water supply and wastewater treatment facilities and public health problems cannot be rigorously demonstrated on the basis of increasing evidence of diseases reported, water-borne human wastes are clearly implicated in the transmission of these diseases. The general inadequacy of water supply and wastewater services, especially in the summer, and in districts with poor housing conditions, may be expected to result in a high incidence of such water-borne and water-related diseases.

The characteristics of the Nile water, the main source of drinking water in Cairo, Alexandria and the Canal Cities, has been influenced by the completion of the Aswan High Dam. Analysis from five river cross-sections: Aswan, Asyuit, Cairo, the Damietta branch and the Rosetta branch, indicate that plankton types and distributions are changing periodically, turbidity is increasing, coli counts are higher and more diversified and the occurrence of oil slicks on the river is more frequent due to increased navigation. These changes in the quality of the Nile water have important implications regarding the cost of potable water treatment.

Existing wastewater collection systems in Cairo, Alexandria and the Canal Cities are often overloaded. Extensive portions of the system are operated in surcharged conditions, even during dry weather, and are discharging directly either to river, sea or to nearby surface drains. Large quantities of garbage, trash, toxic industrial wastes and other materials are illegally dumped into the system. This results in a reduction of flow capacity, and ultimately the blockage of sewers.

1.4 Sector and USAID Organizations

The water and wastewater sector is administered by a variety of GOE organizations. At the national level the Ministry of Development has primary responsibility for coordinating the development and operation of the sector. The Minister exercises his responsibilities through NOPWASD which is the successor agency to GOSSD and GOPW. The Ministry of Health is involved indirectly through its responsibility for assuring adherence to pollution control laws and potable water quality standards.

Day to day management of the sector is vested in several types of organizations with varying levels of responsibility. (See Annex C.) With regard to water supply, Cairo and Alexandria have fully integrated water authorities, GOGCWS and AWGA, which undertake both system development and operation using independent budgets established by the Ministry of Planning (Bab 3) and Ministry of Finance (Bab 1 and 2). The Chairmen of these bodies are under the administrative control of their respective governors.

In the three Suez Canal Cities a fully integrated development/operations service is provided by the SCA using a small part of its Bab 1, 2, and 3 budgets established by the Ministries of Planning and Finance. The SCA water service is not controlled by the three governorates or the Ministry of Development.

In all other areas, both urban and rural, NOPWASD is responsible for developing water systems using its own Bab-3 budget while the Governorates operate and maintain the systems out of their Bab 1 and 2 budgets. In the Governorate of Behiera, a public sector water company is being organized which will eventually provide a fully integrated service financed by user charges, but it has yet to reach that stage of development and currently operates on the NOPWASD-Governorate organizational model.

In the wastewater subsector, Cairo and Alexandria also have individual wastewater authorities, C/GOSD and A/GOSD. A/GOSD operates a fully integrated service combining development and operation using its own budgets under the administrative control of the Governor of Alexandria. C/GOSD operates in a similar way except that

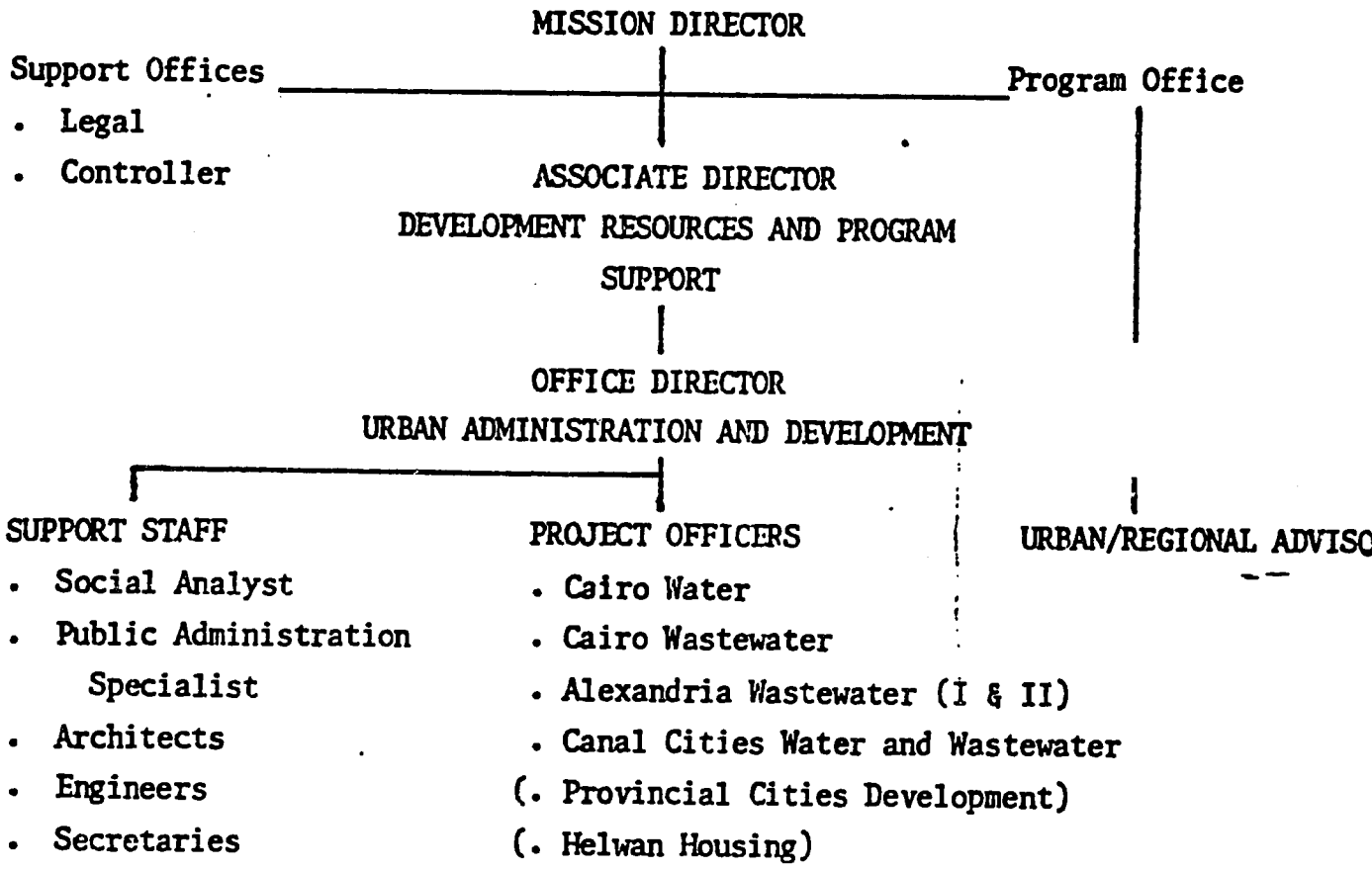
major, foreign financed system development projects come under the control of CWO which is an administrative arm of the Ministry of Development with its own Bab-3 budget. Operations, maintenance and smaller capital investment projects are managed by C/GOSD. NOPWASD is responsible for development of all other wastewater systems using its own Bab-3 budget allocations. The governorates are responsible for the operation of the systems turned over to them by NOPWASD. Parts of each governorate's Bab 1 and 2 budgets are earmarked for operation and maintenance of wastewater systems.

USAID management of water and wastewater projects is centered in the Office of Urban Administration and Development (UAD) which is under the control of the Associate Director for Development Resources and Program Support (AD/DRPS). (See figure 1.1.) UAD draws on the services of Mission support offices such as Legal and Controller, and consults on an ad hoc basis with the Mission's Urban and Regional Advisor located in the Program Office. It is UAD's responsibility to manage the Mission's water and wastewater project portflio. UAD staff include engineers, capital development officers, a social analyst, and a public administration specialist.

In order to address water and wastewater project implementation issues, USAID and the Ministry of Development have formed a Sector Working Group composed of the AD/DRPS and the Senior Under-Secretaries of the Ministry of Development. The Sector Working Group is responsible for resolving implementation problems facing sector projects and seeking means of improving overall implementation performance.

Figure 1.1

Existing USAID Organizational Structure: Water and Wastewater Portfolio Management.



1.5 Sector Financing by USAID and GOE

Both USAID and the GOE have undertaken major financial commitments to the water and wastewater sector over the past five years. A significant portion of USAID's commitments have not yet been expended due to the long lead-time required to plan, design, and contract for sector projects.

USAID Financing (1977 - 1982):

Over the past five year period, USAID has obligated about $389 million for water and wastewater projects. Of this amount $105 million was loan, and $283.8 million was grant monies. Greater Cairo received just under half of the total obligated funds for rehabilitation and expansion of the Rod El Farag water plant, and for the rehabilitation, repair, and minor modification of the wastewater system in Cairo. Alexandria received 26% of total obligations for improvement, upgrading, and expansion of its wastewater system. The three Canal cities received 25% of the total for reconstruction and expansion of both their water and wastewater systems. Overall, USAID has obligated $146.8 million for the water subsector and $242 million for the wastewater subsector. Of these obligations' approximately $102 million had been expended by the end of FY 1982.

GOE Financing (1977 - 1982):

GOE water and wastewater investments under the last Five Year Plan (1977 -1981/82) were included in the public utilities investment total of LE 1016.7 million. Water and wastewater projects constituted about 95% of that total or LE 962 million. Of this amount, approximately LE 505 million was expended in the water subsector, while LE 457 was expended in the wastewater subsector. Thus water and wastewater investments constituted nearly 6% of total Egyptian investment from 1977 to the end of FY 1982. The sector consumed 7.5% of total public sector investments and required the use of 1.3% of GDP during last Five Year Plan period. By the begining of FY 1982/83 the GOE was budgeting LE 77 million for operation and maintenance of water and wastewater systems.

2. SECTOR

In order to address the serious problems inherent in the current water and wastewater situation, the GOE plans to undertake a massive sector investment program over the next five fiscal years. Although such an investment program is urgently needed, it will not, by itself, solve all the problems which plague the sector. Problems of revenue generation, organizational arrangements, project implementation, system operation and maintenance, as well as manpower and training impose serious constraints on the development of the sector. This section of the assessment examines each of these constraints and recommends specific actions to address them.

2.1 Sector Investment Plans 1983-1987

The recently approved GOE Five Year Plan calls for an investment of LE 3.4 billion in the water and wastewater sector between July 1983 and July 1987 in current LE. This represents at least a 250% increase over the LE 962 million invested from 1977 through 1982. Of this total planned investment, approximately LE 2.1 billion is designated for Cairo, Alexandria and the three Canal Cities. (Note: This does not include SCA investments in the water systems for the Canal Cities.)

Water system investments are to amount to LE 589 million with LE 348 million for Cairo and LE 241 million for Alexandria. Wastewater system investments are planned to reach a level of LE 1.5 billion, with LE 1.1 billion for Cairo, LE 300 million for Alexandria, and LE 101 million for the Canal Cities. These totals are exclusive of foreign assitance which may be programed for the sector during the Five Year Plan period.

The GOE investment program has yet to be broken down into specific project investments. At this point it remains an indicative plan designed to program the GOE's financial support to the sector as a whole, as well as to the subsectors and geographic regions.

In support of this massive investment program, AID has pledged to seek authorization of an additional $1 billion to be obligated for the water and wastewater sector during the period FY 1983 through FY 1987. In addition it is anticipated that other donors will contribute the equivalent of up to $180 million over the same period.

The planned water and wastewater investment program represents a substantial shift in investment priorities compared to the preceeding Five Year Plan. Water and wastewater investments are expected to reach 12% of public sector fixed investments compared to 7.5% for the 1977-1982 period. As a result, the sector will claim 2.7% of total GDP generated by 1987 compared to only 1.3% over the last five years. These increases are very large and they create questions about both the absorbtive capacity of the sector and the ability of the economy to sustain such increased levels of investment.

Based on past performance of the sector, it is doubtful that it can absorb the planned level of investment by operating in the same way as it has in the past. The capacity of the Egyptian construction sector is already stretched very thin and can not be realistically expected to expand to accomodate the extraordinary requirements of

the planned water and wastewater program. Similarly, local materials production, though growing, is not in a position to accomodate a sudden surge in demand for pipe, fittings, water meters and other material over the next five years. Thus it will be necessary to rely more heavilly than in the past on foreign construction contractors and materials suppliers with the result that foreign exchange demand by the sector will increase.

At the same time, it has been noted that local currency availability for the sector has been a problem in the past. Notwithstanding all assurances and plans to the contrary, it may be difficult for the GOE to come up with the necessary investment funds without resorting to an increased rate of money supply expansion. This problem will intensify as new water and wastewater facilities come on stream and require increasing levels of operations and maintenance expenditures. It is estimated that if the GOE's Five Year Plan for water and wastewater is realized, the new works alone will require an annual operations and maintenance expenditure of LE 272 million by the end of the fifth year (in current 1982-1983 LE). This compares to an operations and maintenance budget of only LE 77 million for all existing system in FY 1982-83.

Since water tariff revenues will not reach self-sufficiency levels immediately and wastewater tariff revenues can be expected to lag even further, continued budget support for both investment and operations - maintenance will be necessary throughout the five year period. Rationalizing this budget support and combining it with increased tariff revenues must become a high priority for the GOE.

2.2 Revenue Generation

A. Constraints

Because the scarcity of GOE budget support funds for the water and wastewater sector is a major constraint on its development, it is essential that the various sector organizations improve their capacity to generate revenue, thereby reducing the subsidy burden created by the sector. Revenue generation for the sector must originate, for the most part, in the water subsector since billing for wastewater services is normally accomplished through a surcharge on water tariffs. Thus the level of revenue generated by the sector will depend upon the amount of accounted-for water sold and the water-wastewater tariff schedule.

The current water-wastewater tariff schedules applicable in Cairo, Alexandria and the Canal Cities are grossly deficient. Water tariffs (expressed in LE/cubic meter) are substantially below the average operation-maintenance cost of the systems on a per cubic meter of water sold basis. They are even further below their required levels if routine annual improvements and debt service are included in calculating the cost of water sold. Wastewater tariffs are non-existant at present throughout Egypt.

In the case of Cairo, water tariffs have not changed since the GOE took over the French-operated Cairo Water Comapny in 1956. The average basic cost of potable water sold by GOGCWS is estimated at about LE 0.024/m^3 excluding depreciation, and debt service (including these costs would raise the average total cost to in excess of LE 0.053/m^3). The average water tariff charged by GOGCWS is only LE 0.012/m^3 or about 50% of the average basic cost of water sold. Similar situations prevail in Alexandria and the Canal cities, although Alexandria has raised tariffs for commercial and industrial consumers so that AWGA's average tarrif is about LE 0.029/m^3, compared to a total cost of about LE 0.035/M^3.

Deficient tariffs pose a substantial problem for the sector, but they are also coupled with a major problem of unaccounted-for and unsold water. As much as 40% of all water produced in Cairo goes unsold. Similar problems exist in Alexandria (about 48%) and the Canal Cities (unquantified). These problems arise from:

- leakage due to old or substandard distribution networks,
- faulty metering due to lack of meter maintenance,
- lack of meter reading due to shortages of meter readers, lack of training and lack of performance incentives,
- unmetered stand pipe services in many densely populated areas, and
- failure of most government facilities to pay their water bills.

A major factor contributing to the lack of revenue generation is the fact that water organizations can not retain the revenues they collect. Instead, the revenues are turned over to the Ministry of Finance which allocates budgets to the organizations without reference to the revenues they produce, or even to the organizations' own estimates of the funds required to adequately operate and maintain their systems. Thus sector organizations have no incentive to undertake the difficult and unpopular steps necessary to increase their revenue generation capacity.

B. Recommendations

In order to ease the revenue constraint on the water and wastewater sector several steps must be taken simultaneously during the coming Five Year period. (See also Annex D).

- First, average water tariffs must be increased to a level adequate to ensure that revenues match the cost of operation, maintenance, routine annual improvements and debt service for water systems by 1987.

- Second, a major effort should be undertaken to reduce the volume of unsold water production to no more than 15% by 1987. This will require more accurate measurement of both production and consumption of water.

- Third, a wastewater surcharge should be added gradually to the water tariffs to help defray the cost of wastewater services. The surcharge revenues should be transfered directly from the water organizations to the wastewater organizations. The surcharge should be introduced gradually so that at least 50% of the operation, maintenance, and routine annual improvement costs of the systems are covered by 1987 and 100% coverage of these costs is attained by 1992.

- Fourth, all sector organizations should be empowered to retain their tariff revenues. Budget subsidies for operations, maintenance and debt service from the Ministry of Finance should be established in advance for the next five years on a declining scale that eliminates operating and debt service subsidies for water by 1987 and operating subsidies for wastewater by 1992. (Debt service subsidies would be continued indefinitely for wastewater organizations.)

These steps will not be easy for the GOE, but they are essential if the water and wastewater sector is to attain a semblence of financial viability over the next decade. Without financial viability the sector will continue to suffer the kind of neglect that has lead it perilously close to physical collapse over the past thirty years.

In order to implement these changes the GOE will have to muster more political will than it has demonstrated in the past. (The recent letter from the Minister of Development to the GOE's Higher Committee for Policies and Financial Affairs indicates the potential for tarrif reform soon. See Annex E.) There is strong evidence that the Egyptian people are able and willing to pay for water and wastewater services if the sector organizations can operate them efficiently. For that reason it is also essential that sector organizations are developed which can effectively deliver the needed services. Financial viability and institutional development are closely linked. Neither can be attained without attention to the other.

2.3 Sector Organizational Arrangements

A. Constraints

The performance of the organizations responsible for water and wastewater activities in Cairo, Alexandria and the Canal Cities (excluding the SCA) is adversely affected by a number of factors including:

1) lack of financial self-sufficiency, i.e. complete financial dependency on central government financing for both investments and operation and maintenance of the systems;

2) lack of control over budgets (Babs 1, 2, and 3);

3) low wage scales and inadequate incentive packages for employees at all levels of skills but particularly at the skilled craftsman and professional levels;

4) no overall and coherent set of sector development goals and personnel objectives including skilled staffing and training needs, and wages/incentives budgets;

5) lack of coordination between water development targets and those of wastewater.

The present water/wastewater organizations are neither completely centralized nor decentralized. Rather, authority and responsibility is dispersed among numerous public entities organized at both national and local levels. Consequently, there is neither well structured central goals and controls nor sufficient local authority and autonomy in capital investment projects and in operating and maintenance of the systems. Furthermore, since water and wastewater are run by separate organizations, difficulties in the coordination between these bodies is often encountered.

In the Greater Cairo Area, responsibilities for wastewater are separated between the organization charged with providing for capital development, CWO, and the organization charged with operations-maintenance services, C/GOSD. In addition, both of these organizations, as well as GOGCWS are involved in

operations across three governorates. This presents numerous problems, particularly for the Giza Governorate who believe that their interests, especially in operation maintenance of wastewater, come second to the interests of the Cairo Governorate.

The Canal Cities also face a series of overlapping authorities and jurisdictions in the planning, development, operation and maintenance of water and wastewater services. The SCA is responsible for water investments and operation-maintenance for the cities of Suez, Port Said and Ismailia. NOPWASD handles water investments outside of these three cities, and wastewater investments throughout the three governorates. The individual governorates are theoretically responsible for operation-maintenance for wastewater but appear to have neither adequate budgets nor staff to effectively deal with this service.

From an organizational perspective, the Alexandria Governorate has greater control over AWGA and A/GOSD. The Chairman of both of these organizations report directly to the governor and with the exception of AWGA, serving a small portion of northern Beheira, the activities of both organizations are contained within the confines of the Governorate of Alexandria. Moreover, both entities are responsible for investment as well as operation-maintenance services. One difficulty is in the area of service coordination. There is the danger of water services getting too far out ahead of wastewater services.

B. Recommendations

1. General:

In general, the organizational structure of the water and wastewater sector should be consistant with two basic concepts:

- maximum utilization of autonomous public bodies at the local level to plan, develop, operate, and maintain water and wastewater services, and

- utilization of a national level public body to establish sector policies, coordinate sector financing, and provide local level organizations with technical assistance and training support on a contractual basis.

The GOE has been moving gradually in this direction over the past five years. The formation of GOGCWS, AWGA, C/GOSD and A/GOSD are generally consistant with the first concept, as is the formation of the Behiera Water Company. The merger of GOPWA and GOSSD into NOPWASD is consistant with the second concept. In all cases, much remains to be done to further develop and strengthen these organizations so that they can carry out their sectoral responsibilities.

At the local level; be it municipal, governorate, or metropolitan region, the need is to create financially independent organizations that are responsible to the local political leadership for provision of water and wastewater services. These organizations should be charged with planning, developing, operating and maintaining the local systems. At the initial stage, the organizations may have to contract with other public or private organizations for some or all of these services due to the shortage of qualified staff. However, the local organization should control the financing of these services through independent budgets which are increasingly funded by local user charges.

In the water sub-sector this implies the formation of public water companies under the provisions of the Public Sector Companies Low No. 111 of 1975 (See Annex F for a translation of this law.) Under the provisions of this law, water companies would be fully responsible for:

1) developing overall plans for the company and taking measures to increase production, efficiency, and realization of company goals;

2) creating and retaining a cash flow from company operations sufficient to finance recurrent operations and maintenance costs;

3) replacing and renovating company assets within related company reserves and within operational goals and plans of the company;

4) developing cost-accounting for each company activity and related performance standards;

5) structuring the management and personnel system of the company and determining the employment scheme;

6) estimating revenues and expenditures specified in the company budget and endeavoring to increase revenues and decrease costs;

7) designing and implementing a training system for company personnel.

It should be noted that within the provisions of the Public Sector Companies Law, the company management has greater leeway to provide incentive payments to public employees so as to make their renumeration more competitive with alternative employment opportunities.

In the wastewater sub-sector, the formation of public companies would be premature at this time since these services are not currently designed to be self-financing. Instead, local wastewater organizations should be formed on the A/GOSD model. Under this approach the wastewater "general organization" would be an autonomous local entity with its own budget outside of the governorate budget, but would remain responsible to the governorate for the provision of services. Such general organizations should be made responsible for all aspects of the service. Furthermore, within the limits

of their Bab 1 budget, they should have a significant degree of flexibility to make incentive payments to employees. After wastewater user charges are introduced, the local organizations should be empowered to retain their revenues and move gradually to formation of public water-wastewater companies sometime after 1992.

At the national level, NOPWASD should be strengthened so as to actually take responsibility for those functions that can not be efficiently decentralized to local organizations. These functions include:

- establishment and enforcement of board sector policies concerning: tarrif structures, sector objectives, sector development (especially board coordination of water and wastewater development), manpower requirements, and annual operational goals for the sector as a whole;

- coordination of sector financing by acting as the "advocate" for local organizations in their dealings with the Ministries of Finance and Planning where annual operating and investment budgets are established and drafting of five year investment plans for the sector as a whole;

- coordination of sector manpower development through liason with the CAOA;

- provision of technical services such as system planning, engineering design, manpower planning, and system operation and maintenance on a contractual (fee-for-services) basis to those local organizations which do not have adequate staff to perform these services on their own;

- provision of sector specific training programs for developing managerial, technical, and skilled workers for the local organization on a fee basis.

Although NOPWASD is currently charged with these responsibilities, it has failed to perform them adequately to date. In part this is due to a lack of qualified staff, but primarilly it is a problem of management having to make a transition from being a system operating organization under GOPW and GOSSD to a policy and services organization under NOPWASD. Greater management effort should be applied to hastening this transition. Management advisory services to NOPWASD could help that organization reorient its staff and its procedures to focus on the new objectives.

2. Specific:

With regard to the organizationl structure of the water subsector, a number of changes should be made.

- The GOGCWS (which currently plans, designs, constructs, operates and maintains the water supply system in the Cairo metropolitan region) should be converted from a general organization into a public sector company with the ability to retain its revenues and apply them to its operations, maintenance and debt service requirements. The new Greater Cairo Water Supply Comapny should be responsible to a board of directors headed by the Governor of Cairo with members drawn from all three governorates served by the company.

- The AWGA (which is currently responsible for planning, development, operation, and maintenance of the Alexandria water system plus portions of Mersa Matruh and northern Behiera governorates) should also be reorganized as a public sector company. The company's board of directors should be established by the Governor of Alexandria since service to other governorates consists primarilly of bulk water supply.

- The SCA's Works Division (which is currently responsible for planning, development, operation, and maintenance of the water supply systems in the cities of Ismailia, Port Said and Suez) should be divested of direct responsibility for water services. In its place a Suez Canal Area Water Supply Company should be established as a

subsidiary company of the SCA without altering the current organizational structure or employee benefits arrangements. The company board of directors might include representatives from the three canal cities, but chairmanship and control of the company should be vested in the SCA.

With regard to the organizational structure of the wastewater subsector, another set of changes should be made.

The C/GOSD (which currently operates and maintains as well as undertakes minor extensions of the wastewater system for the Cairo metropolitan region) should be merged with the CWO (which plans, designs, and constructs the major capital developments for the same system). At present the Chairman of C/GOSD is also Chairman of CWO due to the need to closely coordinate the work of these organizations. From planning and operational points of view there is little reason to separate the two activities under separate organizations provided that CWO continues to operate as a well defined projects unit within C/GOSD and reports directly to the Chairman. At the same time, the enhanced C/GOSD should move towards restructuring its operations and maintenance functions on the basis of east bank and west bank divisions to make them more responsive to the concerns of the Giza

Governorate in particular. In this regard it is also recommended that a Water and Wastewater Policy Committee be formed composed of the governors of Giza, Qalubiya, and Cairo, with the latter acting as its head. This Committee would establish the broad policies for development and operation of the systems in conjuntion with the Chairman of C/GOSD and the Greater Cairo Water Supply Comapny.

- The A/GOSD (which currently plans, develops operates, and maintains the wastewater system for Alexandria) should remain as presently organized, i.e. a general organization responsible to the Governor of Alexandria. Coordination of water and wastewater services should be the responsibility of a Governor's council, headed by the Governor with the Chairmen of A/GOSD and the Alexandria Water Supply Company as members.

- In the three Suez Canal cities, NOPWASD (which is responsible for planning and development of the wastewater systems) should be divested of these responsibilities as soon as the wastewater subsector can be reorganized in the Suez Canal area. One approach to reorganization would be to form wastewater organizations in each governorate, i.e. I/GOSD in Ismailia, PS/GOSD in Port Said, and S/GOSD in Suez. These new organizations should also be responsible for operation and maintenance of the systems which will be constructed. These organizations should have their own budgets (Babs 1, 2, and 3) outside of their respective Governorate budgets as is the case with A/GOSD and C/GOSD. Since it will take time to organize and

staff these organizations, they should use their budgeted funds to contract with NOPWASD or SCA for both development and operation - maintenance services until they have developed their own capacity. Another viable option would be for the SCA to initially assume responsibility for development, operation, and maintenance of the wastewater systems within the Works Division which currently manages the water systems. These services could then become part of an SCA subsidiary company for both water and wastewater services. Either of these options would be preferable to the current arrangement. The USAID-GOE Joint Sector Steering Group should undertake an in depth review these options and implement the one which is most advantageous.

Finally, in all of the wastewater systems the responsible organizations should be empowered to collect and retain revenues from wastewater tarrifs. Such tarrifs should be levied as a surcharge on water tarrifs, collected by the water companies, and transfered to the wastewater organizations. These revenues should be treated as an addition to agreed annual budget subsidies and should be expended or reserved at the discretion of the individual organizations.

3. Implementation:

Restructuring the organizational arrangements in the water and wastewater sector will take time. However, the changes recommended above can be prioritized.

The first priority is to convert GOGCWS and AWGA into public sector water companies.

The second priority is to reorganize the wastewater services in the cities of Ismailia, Port Said, and Suez.

The third priority is to strengthen and reorganize NOPWASD as a policy and technical services organization serving the sector as a whole.

The fourth priority is to merge C/GOSD and CWO into an integrated planning, development, operations, and maintenance organization for wastewater services to the Cairo metropolitan region.

The fifth priority is to form a Suez Canal Area Water Supply Comapny as a SCA subsidiary providing water services to Ismailia, Port Said, and Suez.

All of these recommendations should be implemented as soon as possible including the initiation of wastewater tarrifs. A reasonable target would be that these actions should be completed or well underway by 1985, but a detailed schedule of actions should be negotiated between USAID and the GOE as part of the process of establishing the conditions precedent to future obligation of AID funds for sector development.

2.4 USAID Organization Arrangements

The current USAID organization structure was devised to manage portfolios of discrete projects. It is not well adapted to address wider issues such as user tariffs and institutional development which affect the water and wastewater sector as a whole. It is recommended that USAID modify its management structure to make it consistent with a sector funding mode of operation. (See Section 5.3)

A. Constraints

The current USAID management structure is focussed on individual projects. USAID identifies projects, designs projects, obligates life-of-project funding, issues project implementation letters and operates primarilly through project officers. Water and wastewater projects are grouped into a sectoral portfolio assigned to the UAD Office within the Mission which report to the Associate Director for DRPS. Inter-office coordination concerning sectoral issues takes place almost exclusively prior to obligation of project funds. While this works well for managing individual projects, a large sector assistance program will require an on-going structure for debating and formulating the Mission's sectoral policy by drawing on all relevant Mission offices.

At the same time, successful project implementation depends on close cooperation between UAD project officers and various staff officers in the Program, Legal, and Controller's offices. Each UAD project officer is left

to organize this cooperation on his own. While this works well currently, there will be a need for more inter-office coordination on sectoral implementation issues as the program develops.

B. Recommendations

In order to better address both the policy and implementation issues associated with the water and wastewater sector, it is recommended that the Mission reorganize its management structure (See Annex G) to incorporate:

- a Water and Wastewater Sector Policy Group
- a Water and Wastewater Sector Executive Committee, and
- a Water and Wastewater Program Management Organiztion.

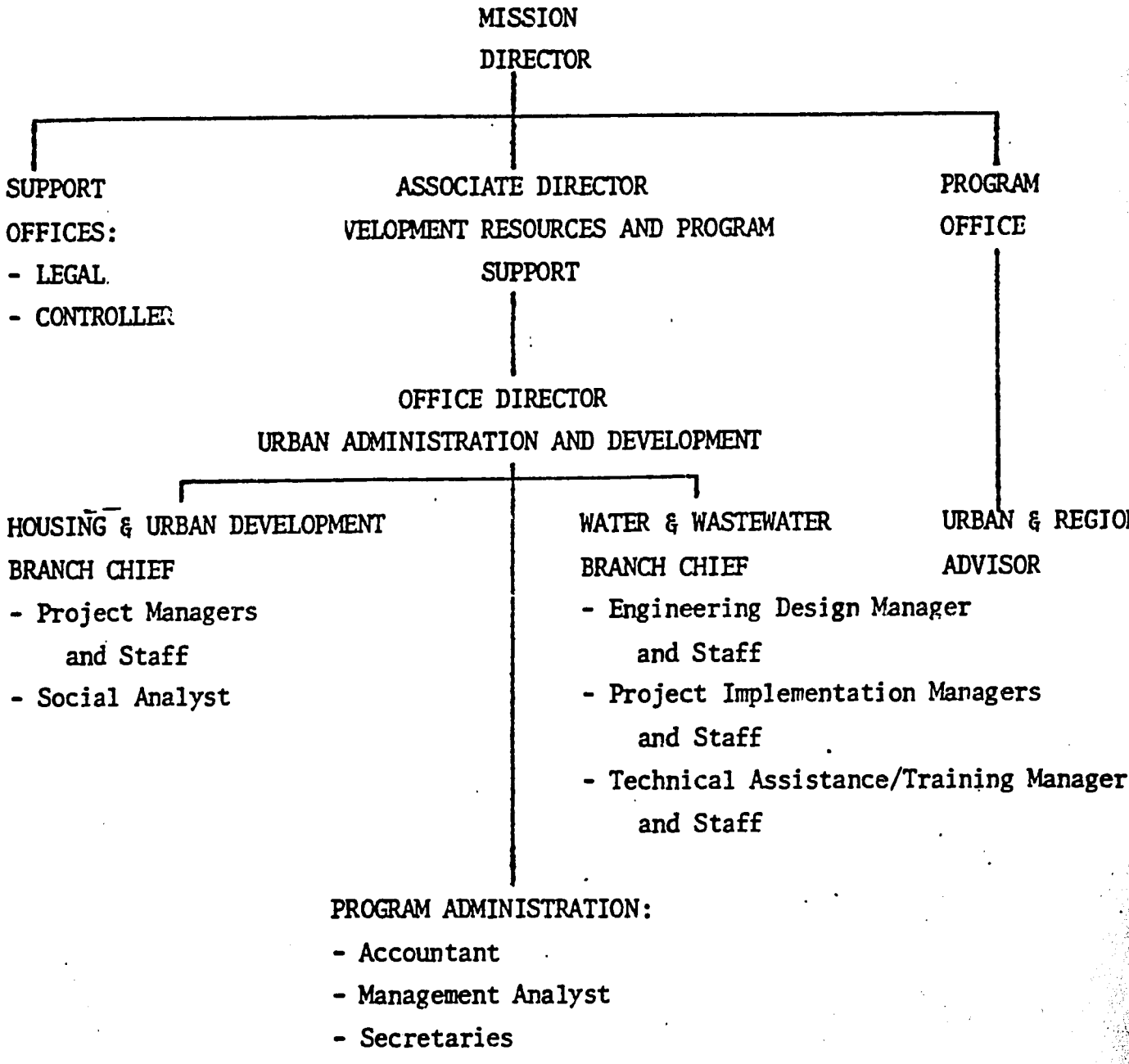
The Sector Policy Group would be responsible for coordinating Mission policy in the water and wastewater sector. Headed by the Associate Director for DRPS it would include Office Directors from UAD, Health, and Program Analysis and Development.

The Sector Executive Committee would be responsible for coordinating execution of the sector projects under the leadership of the UAD Office Director. The Committee would meet regularly to manage all activities required to: obligate funds for the sector; contract for design, implementation, and technical assistance services; and control expenditures of program funds.

Sector Program Management would be vested in a reorganized UAD office as shown in figure 2.1.

Figure 4.1

Proposed USAID Water and Wastewater Organization Structure



2.5 Project Planning, Design, and Implementation

A. Constraints

To date, the major capital improvements to the water and wastewater systems of Egypt are still mainly in the design stage. Master plans for water and wastewater system development have been completed, with USAID funding, for the cities of Alexandria, Cairo, Ismailia, Port Said, and Suez. Water system improvements have been designed for these same cities. Implementation of those designs is underway in Alexandria (with IBRD funding), and is about to start in Cairo and the three Suez Canal cities.

Wastewater systems have not progressed as rapidly. Although the "Top priority Projects" are under implementation in Alexandria, the major system improvements have been delayed due to A/GOSD's reluctance to approve master plans calling for ocean disposal of sewage. A/GOSD has also delayed approval of design contract amendments. Never the less, major portions of the design work are complete and could be tendered starting late in FY 1983 or early in FY 1984.

In Cairo, one contract for rehabilitation of wastewater pump stations has been awarded and another is being tendered in FY 1983. Conceptual designs are complete for the major wastewater system improvements but detail design has yet to be initiated for the works on the West Bank of the Nile. These designs will not be finished before the second quarter of FY 1984 if they start immediately.

In the three Canal cities, wastewater system designs are complete but construction tendering has not yet started. It is expected that implementation can begin before the end of FY 1983.

Planning and design of water and wastewater projects has been a lengthy process. Under the best of circumstances it is not unusual for this process to take three to four years. In Egypt, however, the process has been delayed by lengthy planning and design reviews, slowness in design contracting and amendment of contracts, and complex procedures for awarding implementation contracts (both for commodities and construction). In the main, this is due to the involvement of both USAID and GOE sector organizations who are both inadequately staffed to handle the large number of separate interventions they are obliged to undertake. (See Annex H).

B. Recommendations

In order to reduce the time required to implement the GOE 1983-1987 Water and Wastewater Investment Plan, it is recommended that maximum use be made of turnkey (or design-build) contracting. Under this approach USAID and the GOE would give total implementation responsibility to a single contractor for each major, discrete element of the systems. That contractor would complete the design work, procure all material and equipment, and construct/errect the works. The turnkey contractor would be supervised by the existing design engineers. USAID and GOE responsibility would be minimized. The work would be contracted on a lump-sum, fixed time basis once designs had reached the 80% complete stage.

Implementation delays could be minimized using turnkey contracting, but it would entail both GOE and USAID turning over major responsibility to the turnkey contractor and the supervisory engineering firm. Implementation could still be delayed if the GOE does not expedite land acquisition, construction permits, customs clearances, and diversion of existing services and traffic. These implementation activities should be carefully monitored by a joint USAID-GOE Sector Executive Committee composed of the senior Under Secretaries of the Ministry of Development and the USAID Office Director for UAD. (See Annex I) The Joint Sector Executive Committee would be responsible for identifying and resolving implementation problems as well as coordinating the annual Sector Review. (See Section 5.3)

2.6 Operation and Maintenance of Systems

A. Constraints

Proper operation and maintenance of water and wastewater systems has not received adequate attention for several decades in Eygpt. Restrictive budgets for the sector as a whole have fallen harder an operation and maintenance (Babs 1 and 2) than on capital investment (Bab 3). This has contributed to the visible deterioration of the systems. In essence, maintenance is defered until problems become serious enough to require a capital investment project. Despite this approach, water and wastewater personnel have performed technical miracles just to keep their old systems operating. Ingenuity, hard

work and long hours have been substituted for needed spare parts, management systems, and sufficient numbers of skilled workers, supervisors and engineers. The problems of operation and maintenance vary from one sector organization to another, but those mentioned below are found to some extent in all organizations.

In the water subsector, treatment plants are operating at over their designed capacity thus reducing the margin of safety in the system. Water transmission mains are old and leaky resulting in as much as 18% loss of water during transmission. There is a shortage of operable water meters so that large quantities of water (up to 30% of production in some cities) go unaccounted-for.

In the wastewater subsector, there are extensive sewage flooding problems due to overloaded systems: undersized laterals and collectors, inadequate lifting and pumping capacity, and insufficient numbers of forcemains. Treatment plants operate in a continuously surcharged condition which adds to flooding problems and causes raw sewage to be discharged from some plants without treatment.

Although many of these problems now require major capital investments to be overcome, the prior lack of adequate operation and maintenance measures has contributed to their creation. The factors underlying inadequate operation and maintenance also vary between organizations. In general, water organizations have somewhat better operation and maintenance programs than do wastewater organizations.

The key factor limiting operation and maintenance performance is the shortage of skilled workers and supervisors. This fact has been lighlighted by every study of the sector since the mid-1970's (see Section 4.7 and Annex J). Underlying the shortage of skilled workers are several causes:

- low salaries based on government pay scales,
- lack of funds to pay adequate incentives and bounses to bring total compensation into a competitive range with alternative employers,
- hazardous working conditions and lack of prestige within the sector (especially the wastewater subsector),
- inability of sector organizations to retain employees that they have trained at their own expense.

There are also other factors which make operations and maintenance difficult for water and wastewater organizations. Inventory control over equipment, material and spare parts is seriously deficient. This results in delays in executing repairs and unorganized purchasing activity. Preventative maintenance systems are generally not employed. Instead, organizations spend most of their time responding to emergencies. Workshop and repair facilities are inadequate in both quantity and quality. Maintenance equipment is not properly operated due to lack of operator training and supervison. Because managers fear equipment will be damaged by workers, they sometimes do not send it into the field at all. There is virtually

no delegation of authority and responsibility within sector organizations. This decision structure places an unmanageable burden on the top level executives who become bogged down in details and are left with no time to deal with broader management problems.

B. Recommendations

There are a number of steps which should be undertaken to improve operations and maintenance in the water and wastewater sector. First, compensation for sector workers must be substantially increased immediately. Since base pay levels are regulated by government service salary scales which must apply to all government workers, the incentive component of compensation must be increased for all workers in the sector. Incentives of no less than 300% of base pay should be provided for all skilled workers, and technical staff. Additional incentives of up to a total of 500% of base pay should be paid to skilled workers and technical staff in occupations where there is an acute shortage of personnel that is not eased as a result of the general incentive payment.

Second, the GOE must commit itself to maintain budget support levels adequate to fully fund the necessary incentives until tariff revenues eliminate this requirement. Incentive payments must not be allowed to decline for lack of funds in the Bab 1 budgets of sector organizations.

Third, sector organizations must undertake intensive recruitment and training programs in connection with the increases in compensation. The number of workers recruited and trained should be in excess of the actual needs of the sector organizaions in recognition of the fact that not all trainees will remain in the sector.

Fourth, the workshop, warehousing, and maintenance equipment needs of the sector organizations should be surveyed immediately. Designs for needed facilities and equipment specifications should be prepared within the next six months in anticipation of future funding.

Fifth, each sector organization should retain a management advisory group to undertake a diagnostic review of operations and maintenance activities as was done in A/GOSD. Based on the diagnostic review, the consultants should prepare a management assistance plan in anticipation of future funding.

2.7 Manpower and Training

A. Constraints

The water and wastewater sector organizations, as outlined above, suffer from severe shortages of experienced and competent staff at all levels. This is particularly true of semi-skilled and skilled workers in the wastewater sector, where low wage levels, and often hazardous and unhealthy working conditions severely limit the number of qualified staff in the various organizations. Although

the government's full employment policy ensures that these organizations have a continuous supply of manpower, there is a continual drain of the better qualified staff (both professional and skilled workers) to better paid jobs in the Gulf area and to other sectors in the economy. Various categories of skilled workers (e.g., plumbers, electricians, and fitters) are in very short supply throughout the sector. The scarcity is particularly acute at the local governmental level where there are often none or only one or two responsible for the maintenance of an entire wastewater system.

Understandably, the quality, number and efficiency of skilled workers as well as other key staff in the sector could be greatly improved by offering salaries, fringe benefits, and promotion opportunities which would be competitive with other employers. Law 47 of 1978 sets the civil service pay scales. There have been several recent attemepts to amend this law to allow for differences in the various civil service groupings according to worker demand, health hazards, etc. The Miners Law (27/1981) has succeeded in developing a new base pay scale, incentive scheme and fringe benefits for workers in the mining sector. Similar proposals have been advanced for the wastewater sector. Recent negotiations underway between the Prime Minister, Chairman of Manpower Committee of the People's Assembly, and the Chairman of the Trade Union Workers Syndicate indicate that a compromise package for those employed in the wastewater sector may be achieved. This would not change the base pay but would increase the mandatory allowances to up to 60 percent of

base pay to take into consideration health and safety factors. In additiion, other descretianary incentives would be added in an attempt to provide a more attractive total wage package in the wastewater sector. (See Appendix K, summary outline of dr ft wage law for wastewater sector).

In terms of training, severe deficiencies exist. Although NOPWASD is charged with the responsibility of providing national level training in water and wastewater trades, it is not currently performing this function to any significant degree. No national level training in the areas of management, financial planning and system design is provided. Although on-the-job training is provided in many of the water and wastewater organizations, this type of training is severely limited. It only meets the needs of the lowest skill levels. Higher skill training needs more formal classroom instruction and access to modern equipment. These are not generally available in all field situations. Some formal classroom instruction is available. The Department of Environmental Health, University of Alexandria, offers courses in sanitrary engineering/ chemistry and the Higher Institute of Public Health in Alexandria hold a training program in environmental health for sanitarians, engineers and chemists, as well as short courses for personnel specialized in water and sewerage treatment. Four Universities, Ein Shams, Cairo, Mansura and Asyut, offer post-graduate degrees in sanitary engineering and some offer training in management skills as well.

B. Recommendations

An overall study of training requirements in the entire water/wastewater sector needs to be initiated. A model for such a study could be the Boyle/A.Young Management Diagnostic Report prepared for A/GOSD which made a number of recommendations regarding the need for management and supervisory development. The objectives of the study would be:

(1) identify the professional, technical and operative skills which need to be developed in both the water and wastewater sector, the level of competence and the appropriate wage levels that should be set;

(2) quantify the numbers needed by organization and by geographical area;

(3) propose how training/educational needs are to be met, the financial resources needed and the incentives that should be developed to secure the highest level of training possible;

(4) develop a phased program for training and initiatives for retention of skilled personnel.

3. SECTOR DEVELOPMENT PROGRAM FOR USAID

During the January 1983 visit of President Mubarak to the United States, AID pledged to seek authorization for an additional $1 billion in assistance to the Egyptian water and wastewater sector. The additional funds, if avilable, would be programmed for obligation during the period FY 1983 through FY 1987 out of the current annual assistance levels. The $1 billion would be in addition to the $388.8 million already obligated for sector projects. This section of the assessment outlines a recommended sector assistance strategy for USAID in terms of geographic distribution of investment, uses of the additional funds, program structure, and steps to be taken to implement the program.

3.1 Geographic Distribution of Investment

It is proposed that the USAID water and wastewater sector program will be focused primarily on the urban areas where AID has already been heavily involved. This strategy is based on three considerations.

1. The GOE has specifically asked AID to concentrate its capital investment in Greater Cairo, Alexandria, and the Canal cities.

2. The concentration of population in these urban areas, both now and in the future, will mean that AID's limited capital investments will provide benefits to the maximum number of people.

3. The existence of system master plans and on-going engineering design work in these urban areas will reduce the time required to design and construct individual project elements.

To the extent that secondary cities (such as Minia, Beni Suef, and Fayoum) develop water and wastewater investment projects not otherwise funded by AID or other donors, these will also be given consideration for funding within the water and wastewater sector program. The recommendations of the National Urban Policy Study will be used in determining the priority of investments in other secondary cities. That study recommended emphasis of investment in Qena/Naga Hamadi, Assuit, Aswan, Tanta, and Mansoura.

3.2 Technical Considerations

The USAID water and wastewater sector program should concentrate capital investments in technical areas that will provide immediate and visible improvements in service to consumers. In practical terms this means concentrating our investment in wastewater system improvements. Such investments would be designed to provide city-wide wastewater collection systems adequate to meet projected requirements for the year 2000 and thereby:

A. reduce the incidence of wastewater flooding in sewered areas where wastewater systems are overloaded or badly deteriorated, and
B. extend wastewater collection systems into unsewered areas where existing water supply is creating flooding problems.

Funding for water systems should be limited to projects that will not further exacerbate wastewater problems such as commodity support to operations and maintenance organizations to help them reduce water leakage, and technical assistance in reducing the percentage of unaccounted-for water production and improving customer service.

On the wastewater side, this strategy calls for capital investments in improvement and extension of collection networks, rehabilitation and upgrading of sewage pumping stations and force mains, and rehabilitation of existing sewage treatment plants to provide effective primary treatment. These capital investments should be phased and prioritized to produce the maximum level of relief to flooded areas. For this reason, there need be no investment in new primary or secondary treatment plants at this time. The strategy also calls for improvement of solid waste collection efforts designed to prevent sewer blockage and improve overall environmental sanitation. Emphasis will be placed on improving solid waste management system and integrating new collection technologies with traditional approaches.

On the water side, the strategy calls for efforts to reduce water wastage and leakage which contribute to flooding. In this regard, the single most effective measure to reduce wastage would be a substantial tariff increase. Capital investment in water systems can be left to other donors that have expressed interest in this subsector since such investments are likely to be easier to divide into smaller projects. USAID funding should concentrate on commodity support for operations and maintenance programs and management assistance to water organizations.

Management assistance should also be provided to wastewater organizations to help them improve their operations and maintenance functions and generally upgrade their institutional capacity to manage the wastewater problems in each city. NOPWASD should also receive USAID funded management assistance to strengthen its capacity: to establish sector policies at the national level; to coordinate sector funding for both capital investment and operations-maintenance expenditures; to provide engineering support to governorate level sector organizations; to provide other types of technical assistance to sector organizations; and to provide comprehensive manpower planning and training services for the sector.

The construction element of the sector program should be comprised of projects that can be completed quickly. Therefore, priority should be given to projects for which land has been acquired and on which construction can start within twelve months of the obligation of funds.

3.3 Program Structure

An indicative plan for USAID assistance to the water and wastewater sector is provided below. This plan shows how USAID funding could be distributed among various uses in support of overall sector development. It is based upon the current portfolio of water and wastewater projects but recommends a major restructuring of the assistance program in light of the findings of this assessment.

Projected funding levels are based on estimates of the cost to complete the various works described. In the cases of Cairo, Alexandria, and Canal Cities wastewater projects, the cost estimates include dollar funding for the local currency component of the construction services. Actual funding levels for various components of the program need not adhere exactly to those indicated here. Rather, obligations should be based on the needs of the sector as the program is implemented.

The sector program for water and wastewater should be structured to allow maximum flexibility to shift funds among various sector activities so that annual (new) obligations can be limited to actual sector needs for the immediate future. It should not tie up funds in projects which are not being implemented according to schedule. Rather, it should make it possible to shift funds from slow moving projects to fast moving projects.

In order to achieve this flexibility, all existing AID water and wastewater projects should be merged through use of a sector Program Assistance Authorization Document (PAAD). The PAAD would establish a Water and Wastewater Sector Assistance Program. The money in the Sector Program would be allocated between three program activity catagories:

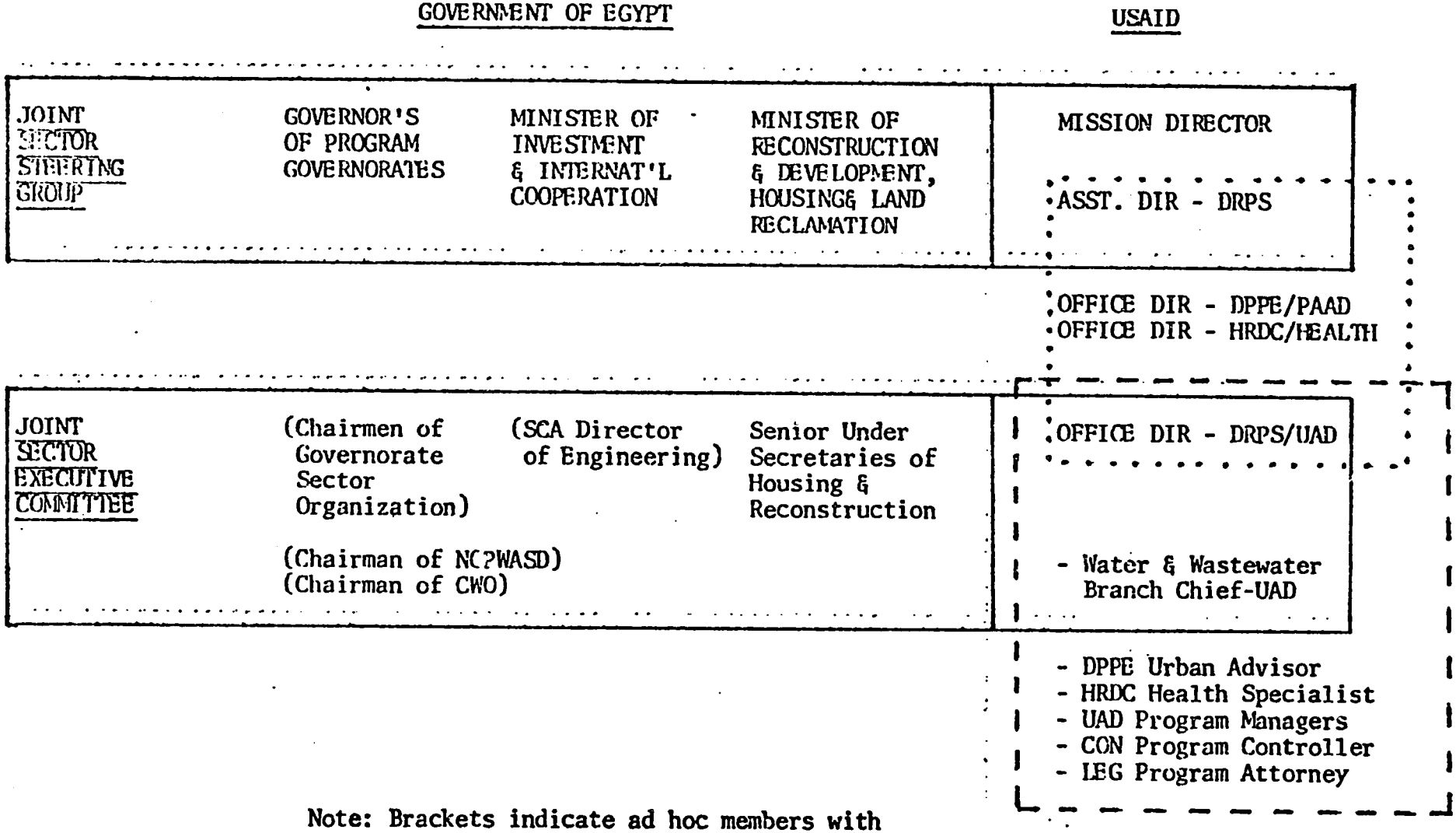
1. Project Design and Supervision Services Fund,
2. Project Implementation and Commodity Support Fund,
3. Management Assistance and Training Fund.

Initially the money in each fund should be based on current USAID obligations and sub-obligations. For example, in the case of the Cairo Water Project after being merged into the Sector Program the subobligation for ES-Parsons' design and supervision services would become part of the Project Design and Supervision Services Fund. The subobligation for the Howard-Harbert-Jones construction services plus all subobligations for commodity procurement would become part of the Project Implementation and Commodity Support Fund. The subobligation for the Black and Veatch tariff studies for COGCWS would become part of the Management Assistance and Training Fund.

The process of proposing new Sector Program obligations should be undertaken by a USAID-GOE Joint Sector Steering Group operating at the level of the USAID Director and the relevant GOE Ministers (see figure 3.1). The GOE representation should include (but not be limited to) the Minister of Investment and International Cooperation, the Minister of Development, and the Governor's with jurisdiction over cities included in the Sector Program. Their deliberations would take place in light of the recommendations contained in an annual Water and Wastewater Sector Review. The annual Sector Review should be the major product of a Joint Sector Executive Committee composed of representatives from USAID, and the Ministry of Development. The Executive Commitee should consult with all GOE organizations participating in the Sector Program. The Joint Sector Steering Group should also act upon the recommendations of the Joint Sector Executive Committee with regard to reallocation of money between the various Program Funds.

Figure 7.1

PROPOSED USAID-GOE SECTOR PROGRAM MANAGEMENT STRUCTURE



Note: Brackets indicate ad hoc members with responsibility for projects under execution by their respective organizations

... USAID Sector Policy Group

--- USAID Sector Executive Committee

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Any new money obligated for the Sector Program not immediately subobligated under specific contracts should be available for allocation to any of the three funds with approval of the USAID-GOE Joint Sector Steering Group. Similarly, any new money allocated to a fund but not yet subobligated should be available to finance that funds' activities in any organization covered by the Sector Program. Thus those GOE organizations that are able to move forward quickly with their projects should have access to all new unsubobligated money in the Sector Program.

Annual (new) obligations proposed for the Sector Program should be based on the anticipated level of subobligation required by each fund over the next twelve months and not on a predetermined annual obligation level. The proposed obligation would be the difference between projected subobligations of each fund and the unsubobligated allocation currently available in that fund. Actual obligation of new money to the Sector Program should be contingent upon the GOE having satisfied specific conditions precedent (CP's) to obligation established at the outset of the previous year's funding cycle. These CP's should relate to specific steps to be taken in improving revenue generation and institutional development in the sector as outlined in this assessment.

Such a program structure would have several advantages over the current project funding mode. First, it would permit greater flexibility of financing for projects within the sector. Second, it would permit obligation of only those funds which would be needed for the sector in the coming twelve months. Third it would permit a high level Joint Sector Steering Group to address sector issues in the context of agreed goals and annual AID sector obligations. With these advantages it should be possible to successfully undertake a major expansion of USAID investment in the water and wastewater sector.

The USAID Water and Wastewater Sector Assistance Program should be structured along the lines indicated in figure 3.2. Current obligations for sector projects would be maintained at their current levels. New obligations would be allocated according to the following general distribution:

- $60 million for Project Design and Supervision,
- $1,304 million for Project Implementation and Commodity Support,
- $44 million for Management Assistance and Training.

Figure 3.2

INDICATIVE USIAD PROGRAM STRUCTURE FOR THE WATER AND WASTEWATER SECTOR
FY 1983 - 1987 ($ MILLIONS)

ACTIVITY	PROGRAM FUNDS			
	DESIGN & SUPERVISION	PROJECT IMPLEMENT-ATION	MANAGEMENT & TRAINING	TOTAL
ALEXANDRIA WASTEWATER (I)				
. CURRENT OBLIGATIONS	8.5	6.5	0.0	15.0
. FUTURE OBLIGATIONS	0.0	0.0	0.0	0.0
. SUB-TOTALS	8.5	6.5	0.0	15.0
ALEXANDRIA WASTEWATER (II)				
. CURRENT OBLIGATIONS	32.7	47.7	6.9	87.3
. FUTURE OBLIGATIONS	27.3	547.3	13.1	587.7
. SUB-TOTALS	60.0	595.0	20.0	675.0
CAIRO WASTEWATER				
. CURRENT OBLIGATIONS	18.6	76.5	4.0	99.1
. FUTURE OBLIGATIONS	22.0	642.0	8.0	670.0
. SUB-TOTAL	40.6	718.5	12.0	769.1
CAIRO WATER				
. CURRENT OBLIGATIONS	7.7	81.2	2.5	91.4
. FUTURE OBLIGATIONS	2.0	8.0	1.5	11.5
. SUB-TOTALS	9.7	89.2	4.0	102.9
CANAL CITIES WATER & WASTEWATER				
. CURRENT OBLIGATIONS	11.9	84.1	0.0	96.0
. FUTURE OBLIGATIONS	9.0	77.0	1.0	87.0
. SUB-TOTALS	20.9	161.1	1.0	183.0
COMMODITY SUPPORT & MANAGEMENT ASSISTANCE				
. SUB-TOTALS	-0-	30.0	20.0	50.0
TOTAL PROGRAM				
. CURRENT OBLIGATIONS	79.4	296.0	13.4	388.8
. FUTURE OBLIGATIONS	60.3	1304.3	43.6	1408.2
. SUB-TOTALS	139.7	1600.3	57.0	1797.0
. PERCENTAGES	(8%)	(89%)	(3%)	(100%)

It is not possible to indicate at this time the volume of obligations that will be required in each fiscal year between 1983 and 1987. This will depend on the immediate needs of the sector each year and the GOE's progress in satisfying various conditions precedent to obligation. These factors will be determined in the Annual Sector Review to be undertaken early in each fiscal year.

The funding structure indicated in figure 3.2 is based on financing various specific elements in the overall development of the sector. The amounts indicated are based, for the most part, on very preliminary cost estimates. Actual funding requirements will vary as these estimates are refined.

With regard to the Alexandria wastewater system, the total planned obligation of $690.0 million is expected to provide:

- $15.0 million for completion of all "Top Priority Projects" under the Alexandria Wastewater (I) Project,

- $60.0 million for engineering design and construction supervision of Phases 1 and 2 under the Alexandria Wastewater (II) Project,

- $595.0 million for commodities and construction of Phases 1 and 2 under the Alexandria Wastewater (II) Project (both $ and LE), and

- $20.0 million for management advisory services and operations/maintenance training for A/GOSD.

With regard to the Cairo Wastewater system, the total planned obligation of $769.1 million is expected to provide:

- $40.6 million for engineering design and construction supervision,

- $718.5 million for pumpstation rehabilitation, sewer improvements in flooding areas, and construction of sewer networks on the west bank of the Nile (both $ and LE), and

- $12.0 million for management advisory services and operations/maintenance training for C/GOSD

With regard to the Cairo Water system, the total planned obligation of $102.9 million is expected to provide:

- $9.7 million for engineering design and construction supervision,

- $ 89.2 million for completion of the Rod El Farag Water Treatment Plant expansion,

- $4.0 million for management advisory services and operations/maintenance training for GOGCWS.

With regard to the Canal Cities Water and Wastewater systems, the total planned obligation of $183.0 million is expected to finance:

- $20.9 million for engineering design and construction supervison,

- $161.1 million for U.S. commodities to build three water and wastewater systems, as well as construction financing for the wastewater systems (both $ and LE), and

- $1.0 million for operator training in the three wastewater systems.

With regard to Commodity Support and Management Assistance, the total planned obligation of $50.0 million is expected to provide:

- $20.0 million for management advisory services to;
  - the Canal cities wastewater organizations,
  - NOPWASD, and
  - other GOE organizations that have a direct role in managing the water and wastewater sector such as the Ministries of Development, Finance, and Planning as well as the CAOA.

- $30.0 million for commodity support to water systems in order to rehabilitate leaky pipelines and replace worn out equipment.

3.4 Program Implementation

In order for USAID and the GOE to implement the program outlined above, there are a number of steps that must be taken. Some of these steps can be undertaken immediately, others will take more time to complete.

Immediate Actions:

First, USAID and the GOE should form a Joint Sector Steering Group composed of the Minister of Investment and International Cooperation; the Minister of Development; the Governors of Alexandria, Cairo, Giza, Ismailia, Port Said, Qalubiya, and Suez; the USAID Director and Associate Director for DPPS. The Group's responsibilities should be defined in a letter of understanding signed by all members of the Group. These responsibilities would include:

- Monitoring the development of the water and wastewater sector in terms of project implementation, financial viability, and institutional development,

- Agreeing on specific performance targets for sector revenue generation and institutional development for the coming fiscal year, and each subsequent fiscal year for the next five years.

- Proposing the level of new foreign assistance obligations to be allocated to the Water and Wastewater Sector Assistance Program after consideration of the annual Sector Review,

- Specifying the allocation of Sector Program monies among the three Program Funds and among the sector organizations participating in the Program.

Second, USAID and the GOE should convert the existing Joint Sector Working Group into a Joint Sector Executive Committee composed of the relevant Senior Under Secretaries of the Ministry of Development and USAID's Office Director for UAD, with ad hoc membership of the Chairmen of NOPWASD, A/GOSD, AWGA, C/GOSD, CWO, GOGCWS, and the Director of Engineering for SCA. The Committee's responsibilities would include:

- Identifying and resolving all problems delaying sector project implementation which are not being resolved by the respective sector organizations,

- Commissioning and approving an annual Sector Review to be forwarded to the Joint Sector Steering Group on the understanding that such Reviews will evaluate all aspects of sector performance as may be requested by any member of the Committee,

- Proposing changes in the allocation of monies in the Sector Program among various funds and organizations for approval by the Joint Sector Steering Group.

Third, USAID and the GOE should examine various options to accelerate the implementation of sector projects through the use of turnkey contracting and other methods of reducing both AID and GOE interventions in the project implementation process. This review should be completed before the end of June 1983.

Fourth, USAID should initiate actions to convert its current portfolio of sector projects into a Water and Wastewater Sector Assistance Program through the development of a sector PAAD. This process would entail the definition of specific sector performance targets in the areas of revenue generation and institutional development to be used as conditions precedent to the obligation of new funds for the Sector Program.

Fifth, USAID and the GOE should commission a manpower planning and training study for the water and wastewater sector. This comprehensive study should define the manpower needs of the sector until the year 2000 and propose relevant changes in employee compensation and training required to meet those needs.

Continuing Actions:

The GOE should adopt an explicit water and wastewater tariff policy that ensures the financial viability of the sector through gradual increases in water and wastewater tariffs consistant with the recommendations contained in section 4.2 of this Assessment.

The GOE should implement a program of institutional restructuring and development with the aim of decentralizating day-to-day responsibility for sector development and operations-maintenance to the governorate level while retaining policy control; budget coordination; and engineering, technical, and training assistance for the sector at the national level in a manner consistant with the recommendations in section 4.3 of this Assessment.

The GOE should place increased emphasis on improving the operation and maintenance functions of its sector organizations. In this regard the augmentation of skilled manpower levels through training and increased incentive payments as recommended in sections 4.6 and 4.7 of this Assessment is crucial.

USAID should restructure its own organization to better accomodate the management of a Sector Program rather than a portfolio of individual projects. Such a reorganization should be consistant with the recommendations contained in section 4.4 of this Assessment to form a USAID Sector Policy Group, a USAID Sector Executive Committee, and a strenthened and reorganized UAD Office.

USAID and the GOE should explore all means of reducing the time required to plan, design, and implement sector projects. All means of reducing both AID and GOE interventions in the project life-cycle should be examined and, where feasible, they should be adopted. In particular, the use of turnkey (design-build) contracting should be exploited to the maximum extent possible.

WATER AND WASTEWATER SECTOR ASSESSMENT

USAID/CAIRO

APRIL 1983

ANNEXES
(VOL. 2)

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ANNEX A

URBAN GROWTH PROJECTIONS AND WATER/WASTEWATER SERVICE NEEDS

A. URBAN GROWTH PROJECTIONS AND WATER/WASTEWATER SERVICE NEEDS

The resident population total of 67.5 in year 2000, adopted by the National Urban Policy Study (NUPS) as a reasonable medium estimate for planning purposes, may turn out to be on the low side. It is highly unlikely that the population will be lower than this estimate. First, the magnitude of the urban population to be settled and served is large and is expected to grow rapidly. The natural rate of population increase remains high as the decline in fertility rates anticipated in many population forecasts has not yet appeared.

Secondly, the resident population depends on the rate of migration to other countries, for given rates of natural increase. Although it is very difficult to anticipate the future push and pull factors which will determine this rate of migration, there are indications that the demand for Egyptian labor is declining in other Middle Eastern countries or at least not increasing at rates which have prevailed in recent years. Consequently, external migration may fall below current estimates leading to a higher residential population than anticipated earlier.

The third aspect of the population issue is the proportion of the resident population which will settle in urban and rural areas, respectively. The estimate of year 2000 urban population used in NUPS' calculations of 37.0 million assumes a decline in the rate of population growth in rural areas, but an absolute increase of over 7 million (Figure 1). The amount of rural to urban migration which will occur between now and year 2000 depends upon urban and rural development policies, as well as the rate of natural increase.

Efforts are currently being made to shift agricultural policy in directions which will tend to increase the returns to farmers for their produce. Such changes could result in generally higher incomes in rural

areas. At the same time, however, the evidence suggests that aggregate labor requirements in agriculture will increase very slowly, if at all. Thus, the overall prospect is for improvements in rural standards of living, but continued need for the rural population to seek non-farm employment leading to continued high rates of rural to urban migration. (See Tables 1 and 2 for Population Trends, Master Plan Targets, and NUPS' proposed target urban populations.)

Consequently, there will be a need to expand Cairo's water supply and wastewater system to handle these increased populations. In 1976, the rates of water supply to sewage flows was 1.38 for overall consumption and 1.0 for domestic use. The water supply to sewerage ratio is expected to drop to 1.2 by the year 2000 with about 410 liters per capita per day (l/c/d) of sewage outflows. Moreover, NUPS' Preferred Strategy seeks to design future water/wastewater networks to help orient development to desired growth areas in the northeast, east, south and southwest.

The Alexandria Zone has the highest potential to compete with the Cairo Zone for urban migrants. The NUPS suggests that a target population of 5 - 5.5 million inhabitants by the year 2000. (This is similar to the sewerage master plan projection.) This would suggest that the Alexandria Zone would accommodate 15% of the total urban population and 20% of the increase during the period 1986-2000. The Alexandria water system has a service standard of 283 l/c/d or a production capacity of 688,000 c/m/d in 1979. This is projected to increase to 373 l/c/d or 1.7 million c/m/d by the year 2000. The sewage system had a total flow of 520,000 c/m or 216 l/c/d in 1979. This is projected to increase to 1.5 million c/m/d by the year 2000. Alexandria has a high relative sewage flow to water consumption (roughly 88% of water consumption).

The NUPS also made a special study of future urban development of Suez. NUPS found that due to its strong locational advantages, availability of resources, and expanding industrial base and port

facilities, Suez has significant prospects for future economic and demographic growth.

NUPS has made the following observations on water/wastewater services in Suez:

- In 1976, 53.5 percent of all dwelling units in the city were not serviced by sanitary sewers, and 35 percent were without water.

- The existing sewer system is inadequate to meet current needs. Suffering from blockages and poor maintenance, most sewage is untreated and dumped into waterways.

- Sources of potable water supply are in risk of contamination; the network suffers from poor maintenance and large losses (i.e., 50 percent).

- Industrial and residential pollution of the bay and waterways continues unabated.

- There is currently no systematic collection of solid waste in all areas.

- User charges for water and electricity are insufficient to cover operating, maintenance and expansion costs.

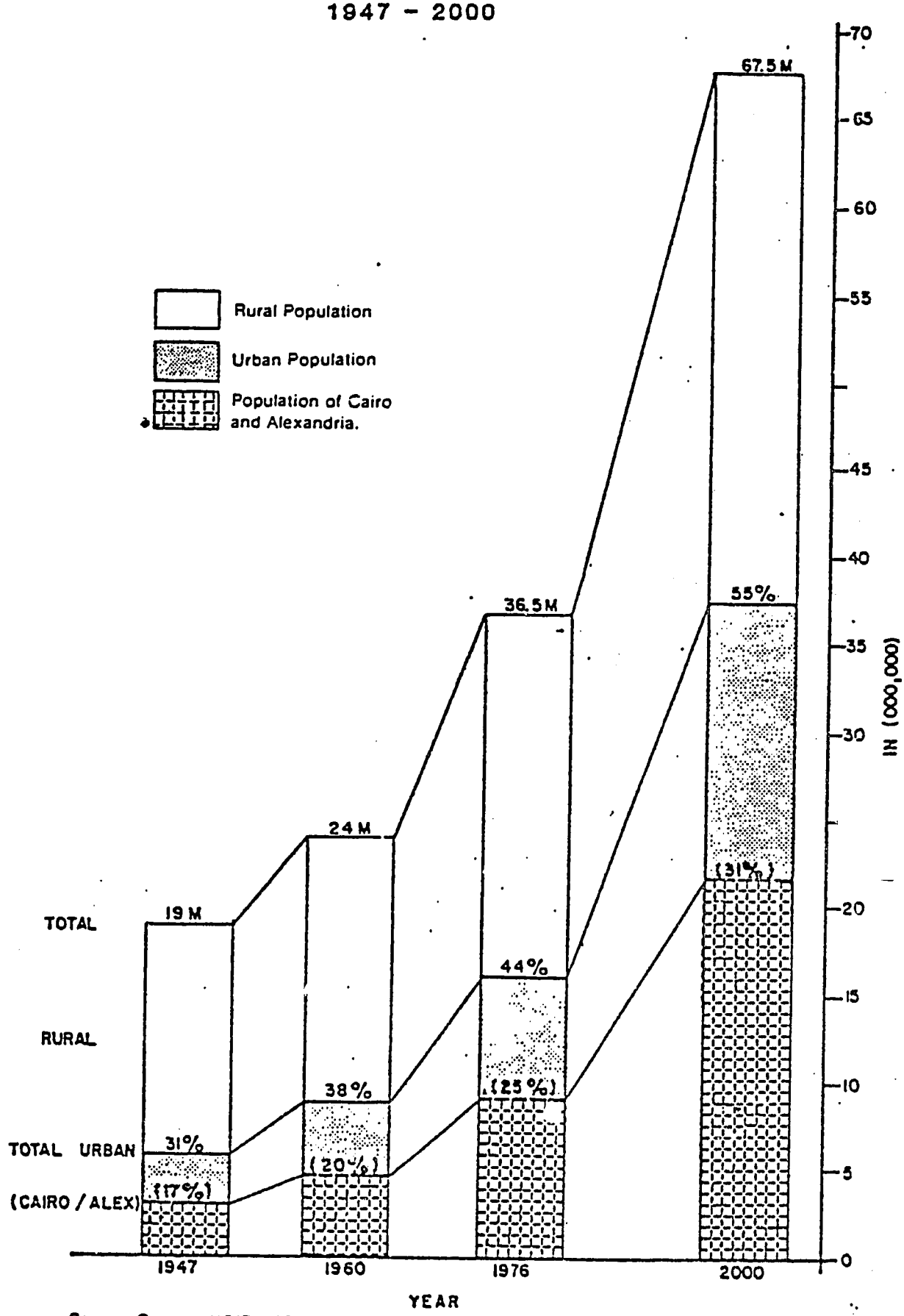
- Plans have been made to upgrade and expand existing water and sewer systems and implement a solid waste disposal facility. However, little specific attention has been given in the past to the most poorly serviced areas and inadequate attention has been given to cost recovery. Neither the General Organization for Sanitary Sewerage nor the governorate charges tariffs for sewer services, while tariffs structures for water will not currently permit full cost recovery for these services.

- Presently, Suez is dependent upon the Ismailia Canal for provision of water for all purposes; yet, increasing and competing demands are being made on the canal for irrigation and urban development (i.e., other Canal Cities, 10th of Ramadan, El Obour, etc.).

- Increases in the capacity of the canal and the provision of a pipeline are not expected to significantly increase provision of water to Suez before 1985. This could jeopardize immediate growth prospects for both Ismailia and Suez.

- Distribution of water is under the authority of the Suez Canal Authority (SCA). However, several parallel and competing distribution systems (particularly for raw water) have been installed by large enterprises resulting in some duplication of service; uncontrolled routing, water usage, and competing demands, and lack of coordination.

URBAN POPULATION
PAST GROWTH AND PROJECTIONS
1947 - 2000



Source: Capmas (1947- 1960- 1976), NUPS "mid-range" projection for 2000

FIGURE I.

TABLE I

URBAN POPULATION DISTRIBUTION [1]

SETTLEMENT	PREFERRED STRATEGY 2000 POPULATION (000's)	ANNUAL POPULATION GROWTH RATE (1985-2000)	TREND 2000 POPULATION	POPULATION GROWTH RATE (1985-2000)
Cairo Metropolitan Region	16,500	3.60	16,368	3.54
Alexandria Metropolitan Region	5,500	4.03	4,495	2.64
Canal	2,089	4.48	2,289[2]	4.62
Delta	6,952	2.23	8,014	3.20
North Upper Egypt	1,811	2.53	1,830	2.60
South Upper Egypt	3,748	3.69	3,629	3.47
Remote Areas: Sinai, Red Sea Coast, Western Desert, Northwest Coast	400	3.16	375	2.71
TOTAL	37,000	3.37	37,000	3.37

1 Urban Population is for the resident population for all areas classified as "urban" in the 1976 Census, excluding the population in the occupied portion of the Sinai in 1976 and expatriate workers. This classification generally included all settlements with 1976 populations greater than 20,000. Target populations for individual settlements over 50,000 are shown in Appendix I-A.1.

2 Trend population for the Suez Canal at 1960-1976 rates not reliable indication due to war evacuation. Figure given is master plan target population.

SOURCE: NUPS Estimates.

TABLE II

MASTER PLAN AND NUPS POPULATION PROPOSALS FOR THE CANAL CITIES (YEAR 2000)

CANAL CITY	1976 POPULATION	MASTER PLAN (2000) TARGET POPULATION	IMPLIED GROWTH RATE PER ANNUM	NUPS PROPOSED (2000) POPULATION	IMPLIED GROWTH RATE PER ANNUM
SUEZ	190,200	988,150	7.1%	750-850,000	5.8-6.4%
ISMAILIA	147,000	560,000	5.73%	400-500,000	3.1-4.1%
PORT SAID	262,600	750,000	4.5%	550-650,000	3.1-3.85%

SOURCE: Master Plans and NUPS proposals.

ANNEX B

CURRENT STATUS OF WATER AND WASTEWATER SYSTEMS

B.1 CAIRO WA

The responsibility for operating and maintaining Cairo's potable and non-potable water systems rests with the General Organization for Greater Cairo Water Supply (GOGCWS). GOGCWS has also the responsibility of designing and implementing the water supply projects in the area of Greater Cairo.

Water Resources:

The water supply in the Greater Cairo is mainly based on the use of the Nile surface water, while groundwater is less extensively used. Both the surface and groundwater sources of the Greater Cairo Water Supply are adequate to meet Cairo's demands through the year 2000. However, the quality of both the Nile River and existing groundwater is changing. Existing surface water quality in Cairo, generally good. However, irrigation return flows, discharges from industrial plants, and river traffic have degraded local water quality on the Nile and Ismailia Canal. Sediment entrapment in Lake Nasser above the High Dam at Aswan has reduced turbidity of the water, but the greater clarity combined with adequate nutrients has increased algae growth.

Groundwater sources within the Cairo basin are largely supplied by infiltration from the Nile. The general quality of groundwater produced is good, although improvements can be made in reduction of iron and manganese concentrations in finished water.

Existing System:

The Cairo Water System currently produces about 2.4 million cubic meters of water per day. The current production comes from six filtration plants using only surface water, five filtration plants with surface water and well fields, and six separate well fields. Nine of the eleven treatment plants are along the Nile while two of the plants are located adjacent to the Ismailia Sweetwater Canal. Three-fourths of the current production comes from the Nile (surface) while the remainder comes from groundwater (wells).

The eleven treatment plants have been built and expanded over the last eighty (80) years. Almost all the water treatment plants are being operated at a rate that exceeds their design capacity by 25 to 50 percent.

The water produced at the 17 different sites is distributed to seven service areas in several pressure zones. The transmission and distribution system contains about 3200 kilometers of pipelines, of which about 50 percent are street distribution mains of 100 to 150 mm diameter. Less than 10 percent of the pipes are 600 mm to 1200 mm diameter mains. Sixty percent of the pipe was installed before 1971 and about 12 percent is more than 40 years old. Within the distribution system reservoirs have a total of 210,000 cubic meters capacity which represents about two hours supply at average flow when full. Because of the high percentage of old and weakened pipelines, lower-than-design operating pressures are used to avoid ruptures and leaks in the lines. However, because of this the reservoirs do not fill. Low pressure and meager storage contribute to inadequate service in some areas of the system.

About 85% of those having access to the public water system are served by house connections and 15% use public fountains. Public fountains are mostly concentrated in the south west of Giza area and in the north east of Cairo area. Those not served use wells and open streams.

In addition, GOGCWS operates a non-potable system for garden watering.

GOGCWS Expansions to Meet Projected Demands:

In April 1977 a joint venture between two U.S. consulting engineering firms, Engineering Science, Inc. and Ralph M. Parsons Corporation (ES-P) in association with the Egyptian Engineering Consultants Group (ECG) entered into a contract financed by AID with the Ministry of Housing and Reconstruction (MOHR) for the study of Cairo's water system.

Early in 1979 the Cairo Waterworks Master Plan was completed. The Master Plan recommended an improvement plan consisting of two parts. Part I, immediate phase, covers the period from 1978 through 1982. Part II, staged development program, covers the period 1982 to the year 2000. The major objective of the immediate phase plan was to provide engineering, planning, and financing information for the use of the ministry to meet the projected demand and improve the reliability of the water service to the consumers in the Greater Cairo area. In part II, staged development, the objective is to determine the optimum number and capacity of sources to satisfy the projected demand and to define the associated plant concept designs, the primary distribution system capacities and arrangement and the storage reservoirs capacity and locations.

Projects In Progress:

There are three major plant expansions currently in the Cairo system one of which is the AID-financed ($91.4 million) expansion of the south portion of the existing Rod El Farag Water Treatment Plant from a current production of 200,000 cmd to about 650,000 cmd. The other two are new plants, one at Fostat and one at Embaba. Both wil be 600,000 m^3/d plants.

The Embaba plant is currently under construction and the West German Government is providing the foreign exchange while the GOE is funding the local construction. It is anticipated that Phase I (300,000 cmd) will be completed late in 1983 or early 1984, and that Phase II (300,000 cmd) will be completed in 1986-87. Fostat is also under construction, and it is anticipated it will be completed by 1988.

The Rod El Farag plant will become the largest plant in the Cairo system producing about one-fourth of Cairo's water. The plant will be constructed by a consortium of U.S. contractors comprised of Paul N. Howard, Harbert Construction and J.A. Jones (HHJ). the construction contract was executed on August 30, 1982. Construction has begun as of January 1983 and will be completed in early 1986.

The AID project is also providing six kilometers of ductile iron pipe and necessary valves, U.S. engineering design and construction supervisory services, and the services of management consulting firm, which will mainly address the issues of water waste reduction, distribution system assessment, organization and administrative improvements and financial plans.

The Japanese government is financing the upgrading and expansion of the South Giza Plant, the increases of the carrying capacity of the primary transmission pipelines and the secondary distribution network by providing a 370 km of water-pipes and the construction of several water tanks and pumping stations. So far, foreign currency commitments from the U.S., Japan and German are as follows:

Government	Commitment, Millions
U.S.	$91.4
Japanese	$34.9
Japanese (probable)	$38.0
German	DM 60

AID Project Financial Status To-Date:

About $87.9 million have been committed for the purchase of pipes and valves, and for the expansion of Rod El Farag water treatment plant. The consultant fees are in the amount of $8.0 millions.

B.2 CAIRO SEWERAGE SYSTEM

ORGANIZATIONAL RESPONSIBILITIES

- The Organization for the Execution of the Greater Cairo Wastewater Project (CWO) has the responsibility of implementing the works for the rehabilitation and expansion of the Cairo wastewater system.

- The Greater Cairo General Organization for Sanitary Drainage operates and maintains the system.

Existing Sewerage System

Cairo has a 70-years old combined system for the collection of sanitary and surface water. The principal features of the system are that the sewered area is served by six principal pumping stations (Ein Shams, Ameria, Souk el Samak, Gamaa, Giza and El Ahram) which deliver wastewater to four treatment works sites (Gabel el Asfar, Kossous, Nahya and Zenein). A fifth site, Abu Rawash, at present is used only for treatment of sludge. Wastewater is delivered to the principal pumping stations through a system of gravity collectors which receive contributions from a large number of drainage areas. The flows from individual areas either gravitates directly to the collectors or to the subsidiary lift stations from which the sewage is conveyed to a collector, often via one or more intermediate stations. The number of the subsidiary pumping stations is about 150. The sewerage facilities of Greater Cairo are in poor condition and badly overloaded. The sewer collectors were designed for a population of less than 2 million. After limited extensions, the system now serves close to 5.5 million inhabitants. As a consequence, sewage flooding occurs daily. Many of the pumping stations are equipped with machinery more than 50 years old. In most cases, pumping capacity is insufficient to handle present flows and stand-by pumping capacity is inadequate. The existing wastewater treatment plants are overloaded and wholly inadequate to treat present flows to an acceptable standard. As a result, only about half the wastewater collected is partially treated. The remainder is discharged to the main drains (Muheit and Belbase) in crude form. The system in its

current condition cannot cope with discharges corresponding to the current planned increases in water supply. Approximately 35% of the Greater Cairo population live in areas which remains unsewered.

Development of the System:

The GOE recognizes the gravity of the situation and has established plans to improve and expand the Cairo wastewater system. In 1976, with the Arab funds the GOE contracted with a joint venture of two British engineering firms, John Taylor and Sons and Binnie and Partners (Taylor-Binnie) to prepare a Master Plan for the Cairo Sewerage System. This study was completed in April 1978. The master plan recommended a massive investment program consisting of 31 top priority projects. These works were planned to be completed between 1983-1985. In January 1978 the GOE requested U.S. assistance in financing the rehabilitation, improvement and expansion of the Cairo Wastewater System. At that time the British Government expressed interest in participating with AID in the Cairo Sewerage project. In 1979 with U.S. and British funds GOSSD engaged a joint venture of American British Consultants (AMBRIC) in association with (EGYCON) for providing the consultant engineering services for this project

AMBRIC has developed a program for rehabilitation and expansion of the Greater Cairo wastewater system capable of serving its sewerages needs to the year 2000.

The rehabilitation work will include the sewer collection secondary system. Comprehensive analysis of critical portions of the existing collection system show the need for providing 146 km of additional sewers to reinforce the hydraulically overloaded system. This element will cost LE 159 million when implemented in 1983-1986. The GOE will finance the cost of this effort.

Another element of the rehabilitation work will be major pumping stations, 100 subsidiary, and ejector stations and Zenein wastewater treatment plant.

A contract has been executed with a U.S. contracting firm for the rehabilitation of the subsidiary and ejector stations. This work is expected to commence in March/April 1983 and will be completed in mid to late 1984. Procurement of U.S. construction services is underway for rehabilitation of five major pump stations at Ameria, Dayoura, Ein Shams, Giza, and Maadi.

The proposed expansion plan will provide for:

- Principal tunnel on the east bank consisting of a 5 meter diameter tunnel from South Cairo to America at a depth varying from 15 to 20 meters below ground level. The flow will be conveyed through a syphon under Ismailia Canal to a primary treatment plant north of the City.

- In addition to the principal tunnel project, branch tunnels will be constructed to tie in the main tunnel to eliminate most of the existing subsidiary pumping stations and relieve the existing overloaded sewer network.

- Wastewater from East bank will be treated at new treatment plants at Shoubra El Kheima and Gabal El Asfar.

- Major interceptors will be provided to serve the urban development on the Nile West Bank and convey wastewater to an expanded treatment works at Abu Rawash and to the rehabilitated Zenien WWTP.

Project Costs:

The implementation of the much needed rehabilitation program and master plan new works is envisaged to be achieved in the next five years (1983-1988). These works are estimated to cost over LE 1600 million, or roughly $2 billion including the engineering, training and management services associated with the project. Cost breakdown is as follows:

Cost Item	Cost, LE x 106	Foreign Exchange Funded by:
1. Technical Services	LE 67	US & UK
2. Rehabilitation:		
• Pump Stations & Maintenance Equipment	60	mostly US, some German
• Secondary Sewer Reinforcement	160	nominal amount by US
• Zenein Wastewater Treatment Plant	27	none so far
3. Master Plan New Work		
• Principal Tunnel	323	mostly UK
• East Bank Scheme	503	mostly UK
• West Bank Scheme	600	possible by US & Japan
	TOTAL LE 1740 million . ($2170 million)	

The foreign exchange component of the Cairo Wastewater Project as itemized above is about LE 700 million. So far, foreign currency commitments from the U.S., U.K., German and possibly Japanese governments are as follows:

Government	Commitment, Millions
U.S. (grant)	$ 129 or LE 107
U.K. (grant & loan)	$ 150 or LE 234
German (loan)	DM 9.5 or LE 3.4
Japanese (probable)	$ 30 or LE 25
TOTAL	LE 369

It is anticipated that AID may finance a major portion of the cost of the expansion program.

AID Project Financial Status To-Date:

About $11.0 million have been committed for the purchase of sewer cleaning and maintenance equipments, pipes, valves, pumps and other equipments needed for the rehabilitation of the pumping and ejector stations. The Consultants fees are in the amount of 10.0 million.

Helwan Suburb

Has its own sewage system which consists of:

(a) Gravity network (diameters ranging from 6 to 15 inches) about 24 kms long.

(b) Main pumping stations (capacity 40 000 m^3/day) which receives flows from the auxiliary pumping stations, and pumps to the sewage farm south of Helwan, near Helwan Airport, through a rising main 18 inches diameter.

(c) The old treatment plant, capacity 15 000 m^3/day, consisting of primary sedimentation tanks, trickling filters and final sedimentation tanks. The present sewage flow of about 40 000 m^3/day is well beyond the capacity of the treatment plant. Sewage is therefore by-passed without treatment to the desert, creating a large sewage "pool" near Helwan Airport. The authorities have requested its transfer to a region 7 kms south of the city. A new pumping station was built on the site of the old farm to pump the effluent to a new farm recently built south of the city for the cultivation of 1 700 feddans (715 hectares).

The German Government is financing the improvements of Helwan Sewerage System. A German engineering firm is providing the consultant services for the project.

B.3 ALEXANDRIA WATER SUPPLY SYSTEM

The Alexandria Water General Authority (AWGA) is responsible for water supply to about 3.0 million inhabitants living in the area of Alexandria, a portion of Behira Governorates and the north west cost to Mersa Matrouh. Also, AWGA has responsibility for supplying water to ships harbouring at the customs zone.

Water Resources:

Surface waters from distributaries of the Nile River, carried mainly by the Mahmoudia and Noubaria canals are the main source of water for drinking and industrial purposes. The supply available from these two main canals is expected to be sufficient through the year 2000. However, the capacity of the canals which directly serve the treatment plants will not be sufficient in the future and expansion will be required. In addition, canals such as the Montazah Canal and, to a lesser degree, the Mahmoudia Canal have become contaminated from sewage overflows, industrial waste discharges and surface runoff.

Existing System

Throughout the service area there are six water treatment plants at various locations:

- Rond Point waterworks
- Siouf waterworks
- Maamcura waterworks
- Fron El Garaya waterworks
- Manshia waterworks
- Maryut waterworks.

The first four waterworks supply the city of Alexandria and later two supply the western suburbs and the north-western coast. The total rated capacity of the six treatment plants at the present time is about 800,000 m^3/d while the demand during summer time reaches 1,250,000 with a deficiency of 450,000 m^3/d. Almost all of the existing water treatment plants are being operated at a rate that exceeds their design capacity by 30 to 50 percent. The distribution system

provides potable water throughout its service area and is connected to the Beheira water system to the east, South and Southeast of Alexandria. Also, the distribution system extends to the north-west till the city of Mersa Matrouh. The distribution system includes about 2000 km of pipeline ranging in diameter from 56 mm (2 in) to 1,100 mm (42 in), 40 booster pumping stations, several storage reservoirs and elevated storage tanks. Most of transmission main lines are more than 50 years old.

About 97% of those having access to public water system are served by house connections and 3% use public fountains.

Development Program of the System

In 1977, with AID funding, the Ministry of Housing and Reconstruction (MOHR) contracted with Camp Dresser and McKee Inc. in association with Chas T. Main and the Arab Technical and Economical Consulting office (CDM) for the preparation of a water facilities master plan for Alexandria.

The master plan was completed in 1978, and recommended the expansion of the Maamoura, Siouf and Maryut treatment plants, in conjunction with the upgrading of the Rond Point treatment plant. Also, the plan recommended the construction of about 350 km transmission and distributions lines, construction of a new pumping station and elevated storage tank and expansion of another pumping station. This program will increase the system capacity to meet the year 2000 demand.

The total capital cost of the recommended program to the year 2000 was estimated at that time to be about LE 118 million, of which US $74 million, will be required as foreign exchange.

In March 1977 the World Bank agreed to lend (AWGA) an amount of various currencies equivalent to US. $ 56 million for financing the foreign exchange expenditures of a project which will increase the capacity of the system by 360,000 m^3/day, the renovation of 100 km of transmission pipelines and the improvement of the reliability of the water services to the consumers.

AWGA hired James M. Montogomry to provide the consultant engineering services for this project.

Due to the good management and control of the expenditures of the project procurements on the AWGA side a saving of about $ 20 million has been achieved. The World Bank agreed that AWGA can utilize this amount for further expansion of the system. An additional increase in treatment capacity of 120,000 m^3/d will be undertaken and another 55 km of transmission pipelines will be installed.

It is expected that this project will be completed before the summer of 1984. This project in conjunction with other projects financed by the GOE will increase the capacity of the system up to 1,873 thousand m^3/d in 1987.

AWGA is still planning on further expansion of the existing water treatment plants, for construction of two new treatment plants to meet the increasing potable water demand from: 1) the rural population growth in the western area which has accelerated with the development of irrigated land fed by extension of El Nasr canal, 2) new development communities started in the western area, and 3) the rural growth and new communities on the eastern side of Alexandria.

AWGA also is planning for further rennovation and expansion of transmission and distribution facilities. The planned capacity of the system in the year 2000 is 2800 thousands of m^3/day.

B.4 ALEXANDRIA SEWERAGE SYSTEM

The Alexandria General Organization for sanitary drainage (AGOSD) designs, constructs, operates and maintains the Sewerage System in Alexandria.

Existing Sewerage System

The existing sewerage system is divided into three zones - central, western and eastern and includes about 150 km of main interceptor sewers, over 1500 km of secondary collectors and street sewers, 35 pump stations of various capacities and 30 km of force mains. The system also includes the East Sewage Treatment Plant intermittently operated since 1974, and having a design capacity of 65000 m^3/day and the 85,000 m3/day West Treatment Plant which is still under construction. Except for flows to East Plant, which receive a degree of partial treatments all sewage of the area, estimated to 700,000 m^3/day, is discharged without treatment to local receiving waters. Major discharges occur into Abu Kir Bay through the Tabia Pump Station, into the Mediterranean Sea through the existing Kait Bay outfall, into the Western Harbor through sewer outfalls and into Lake Maryiout through a number of sewer outfalls and local drains. There are in addition, many local points of discharge to the Mediterranean Sea through shore lines overflows.

The existing system have been developed to serve the inner part of Alexandria from Maamoura in the east to Gabbary in the west. The rapidly developing western areas of Ameria, Mex, Dekhaila, Agamy and Nouzhe, and in the east, Ras el Soda, Siouf Kablia and Abu Kir, have little formal drainage and no Sanitary Sewerage Systems. Approximately, 60% of the area of Alexandria remains unsewered Local floading in areas lacking sewer service and also in some sewered area where system is overtaxed or damaged, together with the discharge of sewage to surface waters of the area endangers public health, limits potential beneficial use of beaches, fisharies and other water associated resources, and creates extensive nuisance and odor problems throughout the City.

Development Program of the System:

USAID envolvement in the program began in 1976 with the foreign exchange financing of the preparation of a Master Plan for the staged development of the wastewater system. This Study was performed by Camp Dresser and McKee Inc., Chas. T. Main and Arab Technical and Economical Consulting Office (CDM).

In 1978, the wastewater master plan was completed, and provided the basis for recommended improvements to upgrade the Alexandria sewerage system to meet the needs of the city till the year 2000. In addition to improvements in sewered areas and sewering of new areas, the plan also called for discharging sewage, after preliminary treatment (screenging and removal of floatables), into the Mediterranean Sea through two outfalls. Subsequent to a USAID Final Enviromental Impact Statement issued in August 1979, the plan was modified to provide primary levels of treatment (preliminary plus sedimentation) rather than only preliminary treatment prior to sea discharge. This decision made it necessary to review and update the original plan.

Late in 1980 with USAID funds, the GOE engaged a joint venture of American Consultants, CH_2M Hill Int. and Metcalf and Eddy Int. in association with A. Abdel-Warith Consulting Engineers and Engineering Consultants Group (WWCG) for providing the consultant engineering services for the project.

As a result of the review and update of 1978 Master Plan, two wastewater management alternatives emerged as the top contenders: sea disposal and land application. Both alternatives offer technically acceptable solutions to the need for improved wastewater management in the Alexandria area. The choice between alternatives may, however, be constrained by capitalization requirements, by land acquisition, or by the results of future field investigations. Implementation of either of these alternatives would require considerable additional study prior to undertaking final design.

To avoid the social and economical cost of delay WWCG concluded that Alexandria's best interests could be served by the immediate identification of the financial and land acquisition constraints associated with the land application alternative. These constraints proved unresolveable at this time. However, AGOSD has retained the option of land application and/or wastewater reuse in some form as a long-range goal for wastewater disposal.

WWCG also has adopted a three phase plan of implementation, which maximizes the use of existing facilities and better utilizes the natural treatment capacity of the main basin of Lake Maryout. Implementation of the first two stages has commenced. The first stage will utilize existing facilities at the east and west treatment plants for primary treatment in order to lessen the polution load on Lake Maryout and make improvements in the collection system. The second phase will expand the two treatment plants, replace, enlarge, and extend the existing short outfall at Kait Bey, and make further improvements to the collection system. At the completion of phase two, all wastewater from the Central and Western Districts will be treated at the West Treatment Plant and Discharged to the sea through the Kait Bey Outfall. the wastewater from the Eastern District will be treated at the East Treatment Plant and discharged to the main basin of Lake Maryout. Phase three is undefined but will provide for the ultimate treatment, reuse and/or disposal of the effluent from the East Treatment Plant.

Significant advantages of the phased implementation plan are: the apparent availability of funds for both the local and foreign costs of the program; early resolution of critical flooding and pollution problems; reduction in pollution of drains, Lake Maryout, and the Mediterranean Sea; early service to outside areas (Abu Qir and Dekheila-Agamy); and improved collection and treatment of sewage flows to the year 2000.

During the preparation of 1978 master plan CDM has identified several urgently required works for which design, construction, and implementation were to be undertaken at the earliest possible opportunity, top priority projects (TPP), several of which are well underway. CDM is providing advisory services for the management of the construction of these projects.

AWSG is proceeding with designs for Phase I and Phase II. Phase I will emphasize in system rehabilitation, services area extensions into the more critical problem areas, and the upgrading and initiation of treatment operations at the two existing treatment plants. Design is well underway with completion scheduled for mid-1983. Phase I improvements are to be operational by the end of 1985. Phase II design provides for further system extensions, the major expansion of the two treatment plant, and a sea disposal system through a new 8 km long outfall off Kait Bey. Phase II facilities are to be operational by 1990.

Contract tenders are (or will) be offered to US prime contractors for major pumping station, treatment plant and outfall construction projects and to Egyptian prime contractors for most collection system work. To date construction contracts in excess of LE 30 million have been awarded for collection system in improvements. The first major US construction tender for 2 pump stations is ready for advertising and will be followed by a five pump station tender and a two treatment plant tender during calendar year 1983.

Construction contracts totaling LE 10 million were awarded in the first six months of FY 82-83 (1 July - 31 December) and an additional LE 48 million plus US $7 million in awards is programmed for the second half of FY 82-83. FY 83-84 awards are programmed to be in excess of LE 90 million plus US $ 70 million.

Project Costs:

The total cost for all three phases of the implementation plan is approximately LE 2,000 billion. Cost break down is as follows, (costs in million):

	Foreign Currency		Local Currency	Total
	$	Equiv. LE	LE	LE
Phase I and II projects	440	365	635	1,000
Phase III projects	240	200	800	1,000
	$680	LE 565	LE 1,435	LE 2,000

USAID Funding for the program:

Total obligations	$ 102,321,000	(15,000,000 Loan) (87,321,000 Grant)

Authorized but not obligated $ 79,679,000.

USAID has expressed willingness to consider increasing its funding to cover the foreign exchange costs of Phase I & II. Phase III needs to be more adequately defined before funding can be solicited.

AID Project Financial Status To-Date:

About $ 6.0 million have been committed for the purchase of pipes and maintenance equipments. The consultants costs are in the amount of $19.0 million.

B.5 SUEZ CANAL ZONE

ORGANIZATIONAL RESPONSIBILITIES

- The Suez Canal Authority (SCA) designs, constructs, operates and maintains the water systems in the three Canal Cities of Port Said, Insmailia and Suez.
- The National Organization for Potable Water and Sanitary Drainage (NOPWASD) designs and constructs the Sewerage Systems in all three Canal Cities.
- The Governorates of Port Said, Ismailia and Suez Operate and maintain the Sewerage Systems in their respective cities.

Existing Water and Sewerage Systems:

All the three cities obtain their raw water supplies from the River Nile via the Ismailia-Port Said Sweet water Canal System. Water treatment includes coagulation, sedinentation, filtration, and chlorination. The water distribution systems obtain their water supplies and pressure almost entirely from storage tanks and pumping stations located at the treatment plants. Water is distributed through cast iron ductile iron and asbestos cement pipes varying from 100 mm to 800 mm in diameter. About 60-70% of the population have water service into their dwellings. The remainder are served by public fountains or private wells.

The total present population of the three cities is about 1.0 million and by the year 2000 the population of the three cities is expected to reach 2.3 million.

The Canal Cities' sewage collection systems, due to the flat topography, consist of short gravity sewers leading to pumping stations from which force mains deliver the sewage to treatment plants, surface drains, or adjacent water bodies. Approximately 55% of residents have sewer service.

The capacity of the treatment plants is inadequate, and they operate at a low level of efficiency. The water and sewerage systems in the canal cities were heavily damaged during the war years 1967 and 1973 and suffered further deterioration during the period the cities were abondoned after the 1967 war. The Ministry of Development, Housing and Land Reclamation (MOHR) and SCA have undertaken their rehabilitation and reconstruction.

Development of the Systems:

In 1977, with AID funding, the MOHR contracted with four U.S. Consulting engineering firms associated with Egyptian firms for the preparation of master plans for water and wastewater facilities in the Canal Cities.

Even before completion of the master plan, the GOE requested AID assistance in financing needed improvements in the three cities. AID approved $96 million for this purpose, comprised of a loan of $60 million in FY 1978, and a grant of $36 million in FY 1979. The master plan were completed in mid-1979.

The four U.S. firms that prepared the master plans were selected to provide consulting engineering services for the rehabilitation and upgrading of canal cities water and wastewater systems.

The rehabilitation and upgrading of the systems will include a number of new and much needed facilities which are immediately required to provide a level of water and sewerage services meeting the needs of Canal Cities.

Designs have been completed for water treatment plant, pump station and distribution system improvements. International tenders for construction of most of these projects were received in late 1982.

Also designs and tender documents for construction of the wastewater projects are essentially complete. The construction phase in all these projects is expected to short in 1983 and expected to be completed in the year 1985.

Additional, AID funds in the amount of $87.0 million have bee requested for the water and wastewater projects. Most of thi additionally required funding will finance the U.S. contracto construction of the more complex elements of the wastewater projects.

The improved water systems will meet the needs of the three cities till the year 2000, while the wastewater collecton and conveyance systems will eliminates the existence of widesprea lagoons of raw sewage in the streets and will have enough capacity to accommodate all future flows from local area sewers to be added due to planned growth within the developin areas of the cities through the year 2000. Existing sewage treatment plant will be restored to their original operating capacity. It is the intent of AID to address treatment problems after the collection systems are well underway.

AID Project Financial Status To-Date:

About $45.5 million have been committed for the purchases of pipes, valves, pumps and other equipment needed for the rehabilitation of the water systems. Another $2.1 million were committeed for the purchase of sewer cleaning and maintenance equipment. The consultants' fees have reached $11.715 million for the design of both water and wastewater systems.

ANNEX C

CURRENT ORGANIZATIONAL ENVIRONMENT

C.1 SECTOR ORGANIZATIONS

The oganizations which are directly active in the water supply and sewerage sector are:

1. Greater Cairo (including urbanized areas of Giza and Qalyubia)

a. General Organization for Greater Cairo Water Supply (GOGCWS) - This organization plans, designs, constructs and operates and maintains water supply in Cairo. The source of its capital funds are received from the Ministry of Planning and the source of its O&M funds are received from the Ministry of Finance.

b. Cairo Wastewater Organization (CWO), established by Ministerial Decree No. 497/1981, plans, designs, and constructs wastewater projects in the Greater Cairo area involving all foreign funded activities. The source of its capital funds are received from the Ministry of Development.

c. Cairo General Organization for Sanitary Drainage (C/GOSD) - This organization is involved with the operation and maintenance of wastewater activities in the Greater Cairo area. It also is involved in the development of various wastewater projects of a limited scale, i.e., connectors, laterals, etc. The source of its funding is thru the Ministry of Finance.

2. Alexandria

a. Alexandria Water General Authority (AWGA) - The Authority is responsible in the planning, development, operation, and maintenance of all water activities in the Alexandria governorate including northern portions of the Beheira Governorate. It receives its capital investment budget from the Ministry of Planning and its O&M budget from the Ministry of Finance.

b. Alexandria General Organization for Sanitary Drainage (A/GOSD), is responsible for the planning, development, operation, and maintenance of all wastewater activities in the Alexandria Governorate. It receives its capital investment budget from the Ministry of Planning and its O&M budget from the Ministry of Finance.

3. Canal Cities

a. The Suez Canal Authority (SCA) is responsible for the planning, development, operation and maintenance of all water activities in the three Canal Cities of Suez, Ismalia and Port Said. The funds for

the capital investment and for O&M services are obtained through the SCA budget. (The development of water activities outside of Ismalia City, i.e., in the Governorate of Ismalia is handled by NOPWASD.)

b. The National Organization for Potable Water and Sanitary Drainage (NOPWASD), is responsible for all capital investment activities in wastewater in the Canal Cities. It receives its budget through the Ministry of Development.

c. The various governorates are individually responsible for the O&M activities in the wastewater area.

An organizational environment table indicating responsibilities and areas of funding for each of the above entities is given below. The legal instruments setting up several of these entities and organizational chart follows.

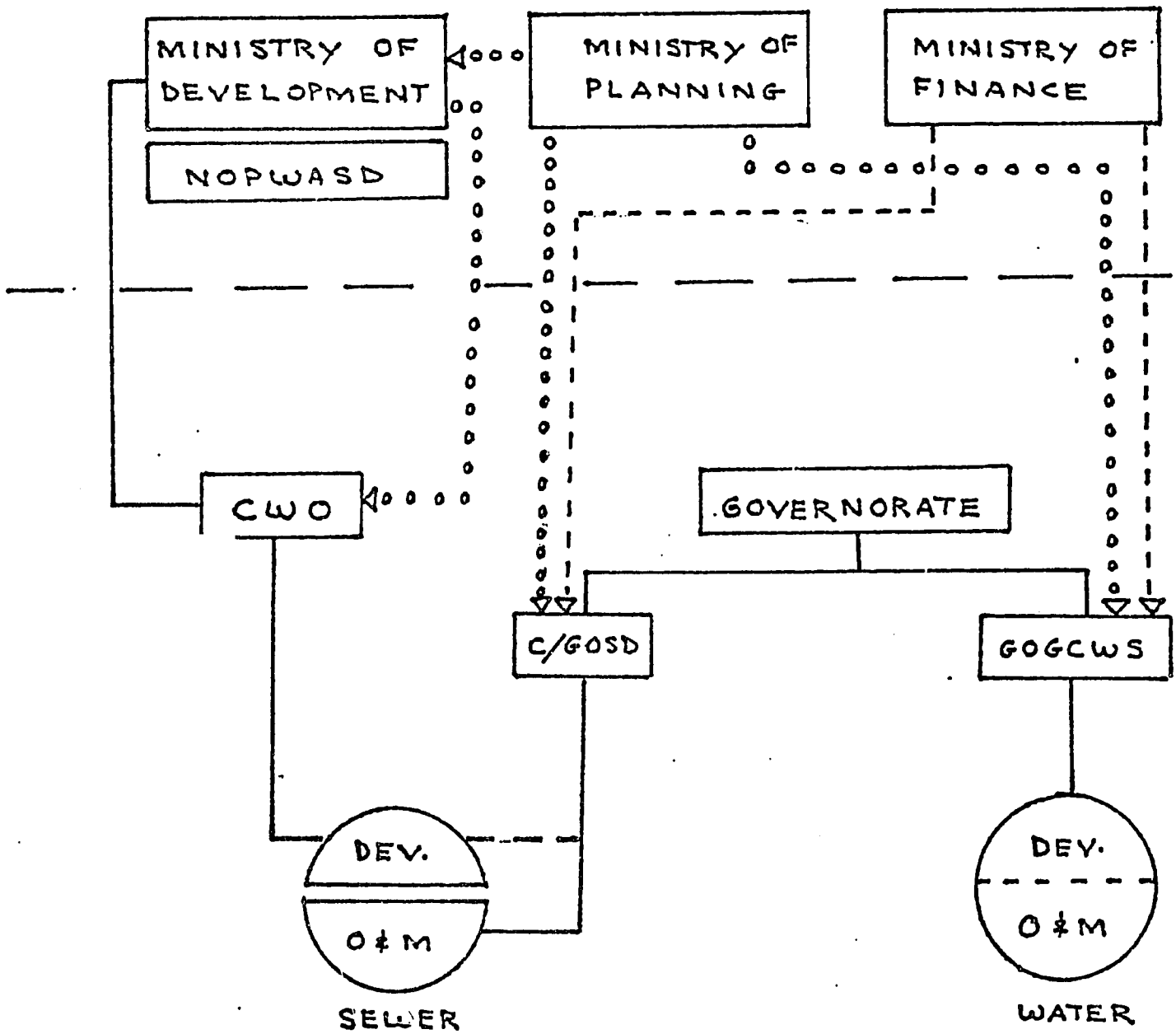
C.2 ORGANIZATIONAL ENVIRONMENT

Areas & Entities	Area of Responsibility: Cap Invest Auth	Area of Responsibility: O&M	Source of Funding: Source of Cap. Funds Bab III	Source of Funding: Source of O&M Funds Bab II
Greater Cairo (incl. urbanized areas of Giza and Qalyabia)				
Water - GOGCWS	x	x	Min Plng	Min Fin
Sewer - CWO	x		Min Dev Bdgt	
- C/GOSD		x		Min Fin
Alexandria				
Water - AWGA	x	x	Min Plng	Min Fin
Sewer - A/GOSD	x	x	Min Plng	Min Fin
Canal Cities				
Water - Suez Canal Authority (SCA)	x	x	SCA Bdgt	SCA Bdgt
Sewer - NOPWASD	x	(x)	Min Dev Bdgt	
- Governorates		x		Gov Bdgt

O&M - Operation and Maintenance
C/GOSD - Cairo gen. Org. for Sanitary Drainage
AWGA - Alexandria Water General Authority
A/GOSD - Alexandria gen. Org. for Sanitary Drainage
SCA - Suez Canal Authority
NOPWASD - National Org. for Potable Water and Sanitary Drainage
GOVs - Governorates
GOGCWS - General Org. for Greater Cairo Water Supply

CAIRO ORGANIZATIONAL ENVIRONMENT CHART

NATIONAL LEVEL:



LOCAL LEVEL:

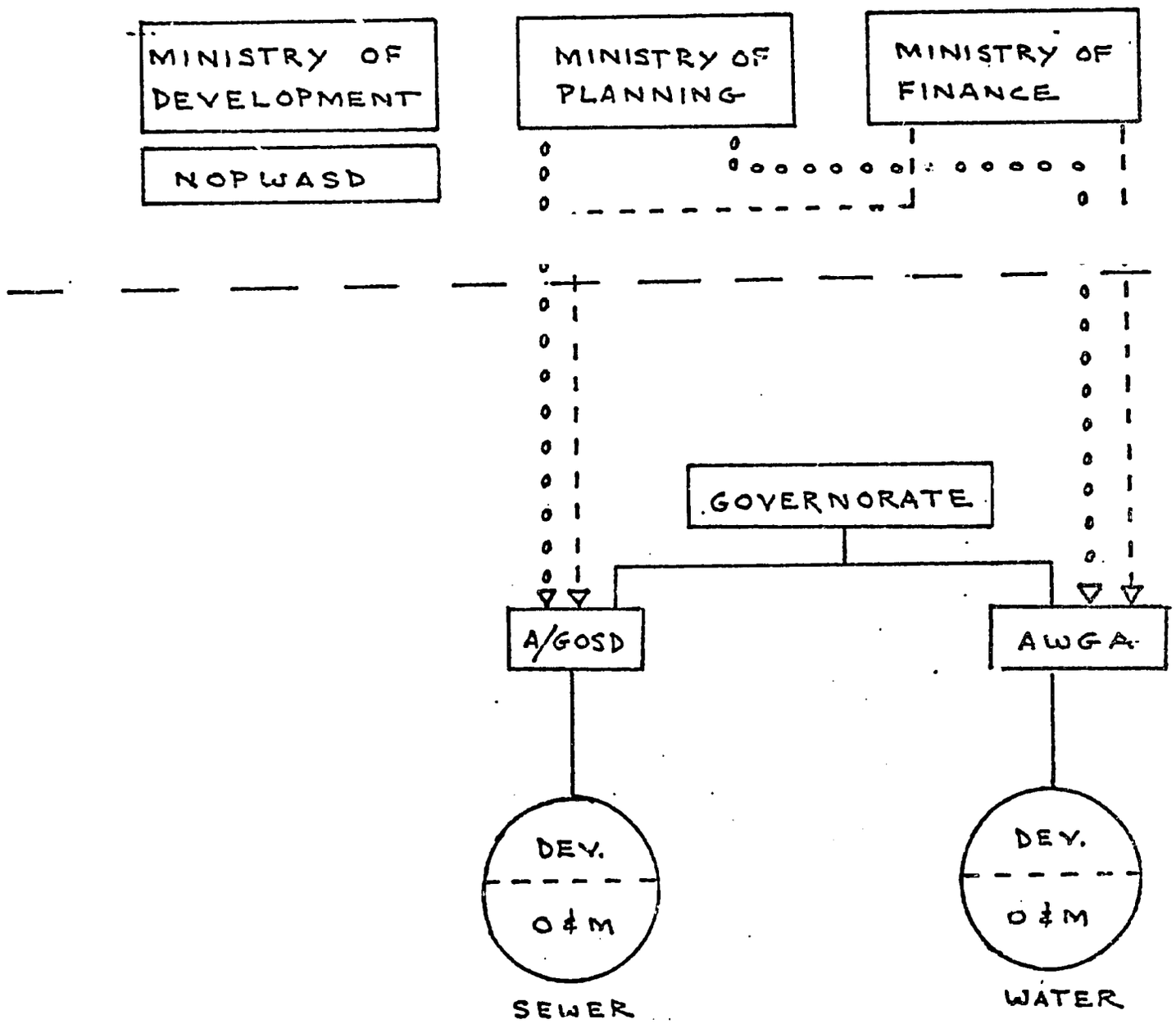
——— ADMIN. AUTHORITY

o o o o o CAPITAL FUNDS

- - - - - O & M FUNDS

ALEXANDRIA
ORGANIZATIONAL ENVIRONMENT CHART

NATIONAL LEVEL :



LOCAL LEVEL :

——— ADMIN. AUTHORITY

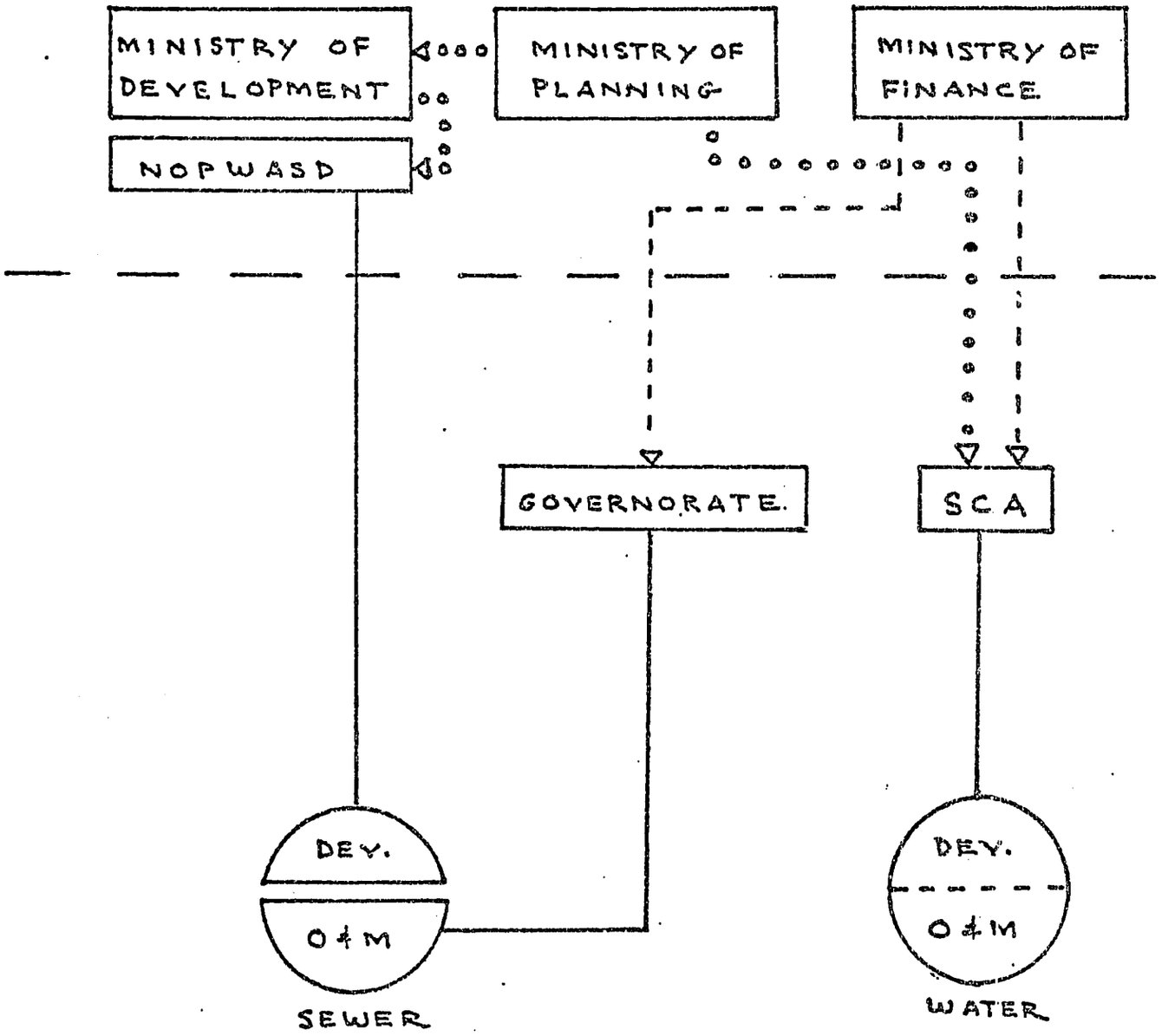
ooo ooo▷ CAPITAL FUNDS

- - - - -▷ O & M FUNDS

CANAL CITIES

ORGANIZATIONAL ENVIRONMENT CHART

NATIONAL LEVEL:



LOCAL LEVEL:

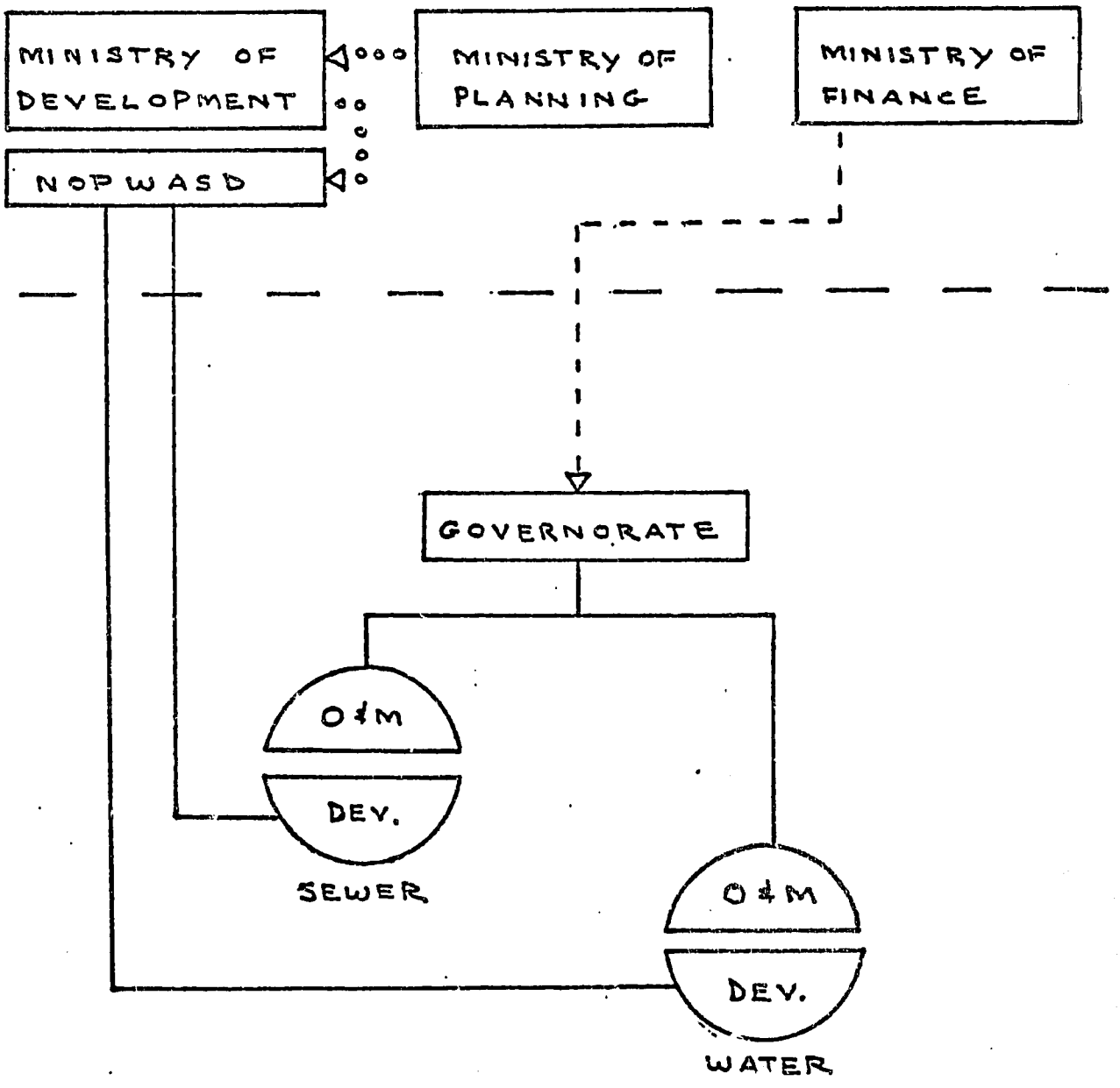
——— ADMIN. AUTHORITY

o o o o o▷ CAPITAL FUNDS.

- - - - -▷ O & M FUNDS

OTHER CITIES
ORGANIZATIONAL ENVIRONMENT CHART

NATIONAL LEVEL



LOCAL LEVEL :

——— ADMIN. AUTHORITY
ooooo▷ CAPITAL FUNDS
- - - -▷ O&M FUNDS

C.3 NOPWASD

Presidential Decree No. 197 for the Year 1981 Concerning Establishing of the National Organization for Potable Water and Sanitary Drainage

The President, after reviewing the Constitution, the law concerning the discharge of wastewater, the law of establishing the general organizations, etc., issues these decrees:

Article I

A general organization called "The National Organization for Potable Water and Sanitary Drainage" is hereby established. Cairo will be the location of this organization. It has an independent essence. It follows the Minister of Housing and will be responsible for preparing the national policy and plans for water supply and sanitary drainage, performing the necessary studies, preparing designs and supervising the construction of the greter national projects which cannot be done by the local authorities or serve more than one governorate.

Artile II

Responsibilities and objectives of the organization:

(1) Preparation of the national general plans for water supply and sanitary drainage works including the preparation of the execution schedules to be considered in the general plan of the nationl.

(2) Coordinate the plans of water supply with those of the sanitary drainage.

(3) Performing the necessary studies and applied research in the field of water supply and sanitary drainage, and participate in establishing quality standards for drinking water and wastewater disposal.

(4) Establish and enforce standards, specifications and technical conditions for sewerage, sanitary drainage and water supply projects.

(5) Provide the technical advice in the field of sanitary drainage and water supply.

(6) Establish training centers to improve the quality of design, construction and operation of water supply and sanitary drainage utilities.

(7) Help governorates in performing the necessary research and preparation of designs for the larger projects and supervise construction when this is required. In return the organization will be paid for these services. Fees will be determined by the Council of Directors in a special ordinance.

(8) Help governorates in preparing contracts for the large projects (Item 7), in tendering locally or internationally, and also in bid evaluation. The organization has the right to utilize the services of local and international consultants for performing this function.

Artcle III

The Council of Directors consists of:

- The Chairman.
- Four from the organization's key personnel recommended by the Chairman chosen by the Minister of Housing).
- Chairman of the water and wastewater organizations in Cairo, Alexandria and Canal Cities.
- State Advisor for the Ministry of Housing.
- Undersecretary of State for Ministry of Reconstruction chosen by the Minister.
- Undersecretary of State for the Ministry of Planning chosen by the Minister.
- Undersecretary of State for the Ministry of Irrigation chosen by the Minister.
- Undersecretary of State for the Ministry of Health chosen by the Minister.
- Four members from the known specialists who are working in the field of water supply and sanitary drainage chosen by the Ministry of Housing for a renewable period of two years.

Artcle IV

Council of Directors is the highest authority which directs the organization. The council can take the necessary decisions so that the organization can accomplish its objectives -- in particular:

(1) Recommend the general policies and plans for the national water supply and wastewater projects, and also determine their priorities in the general plan of the State.

(2) Approve the specs and technical conditions for water supply and wastewater works and also concur the results of research.

(3) Establishing the internal regulations regarding the personnel and financial affairs.

(4) Develop the objectives and general policies for water resources and water uses, for water supply and wastewater utilities, and also to coordinate with the Ministries of Irrigation and Public Health.

(5) Establish training centers to improve the quality of design, construction and operation of water supply and sanitary drainage utilities.

(6) Approve the annual budget and the annual financial report for the organization.

(7) Recommend the loans needed for the organization.

(8) Accept gifts, donations and grants.

(9) Review the periodic progress reports.

(10) Consider the subjects presented to the council from the Minister or from the Chairman.

The council has the right to authorize some of its responsibilities to a committee from its members or to the Chairman, or to one or more of the organization directors. Also the council can designate one of its members or one of the organization directors to perform particular duties.

Article V

The Council of Directors meets at least once per month upon invitation from the Chairman or by the request of the Minister. In case when the Minister attends the meeting the Chairmanship will be for the Minister. Decisions taken by votes. In case of absence of the Chairman, the member who has seniority invites the council for meeting. Minutes of meeting are signed by the Chairman. The council has the right to invite specialists to attend the meetings.

Article VI

Decisions of the council have to be raised to the Minister within one week after meetings. These decisions will not be effective before the concurrence of the Minister or after one month from the date or presenting it to the Minister, except in the case when higher decisions are needed.

Article VII

The Chairman has the authority to direct the organization according to the law of the general organization and the regulations issued by the Council of Directors. He is rrsponsible about the execution of the general policy needed so that the organization accomplishes its objectives. He is also responsible for the verification of the decisions

of the Council of Directors. He has the right to delegate authority to any of the directors of the organization. The Chairman represents the organization in its relations with others.

Article VIII

The financial resources of the organization consist of:

(1) Incomes resulting from the organization's activities.

(2) Budgets from the central government.

(3) Fees for its technical services which the organization may provide to the others.

(4) Loans.

(5) Gifts, donations and grants.

These resources are always considered as public funds.

Article IX

The laws and regulations to be used for the control and review of the organization accounts are those issued for the control and review of the accounts of the general organizations.

Article X

The Board of Directors may design a special personnel system including: wages, incentives, overtime, and pecuniary and nonpecuniary fringe benefits related to the working conditions and the nature of activities.

Article XI

The organization has an independent annual budget.

Article XII

Projects executed by NOPWSD for the governorates will be financed from the budget of the governorates and will be owned, maintained and operated by the governorates.

Article XIII

NOPWASD could preserve its rights through administrative arrangements that could be executed as specified by stipulations of the Administrative law.

Article XIV

Continuation of current systems, regulations and decisions connected with works and personnel that have fallen within the discretions of NOPWASD; as long as they are not conflicting with its enabling Presidential Decree and until being replaced by others.

Article XV

The governorates will assume the responsibilities of construction, maintenance and operation of the water supply and sanitary drainage works. The governorates will acquire the water supply utilities which were owned by GOPW. For those utilities which serve more than one governorate, the utility will be owned by the governorate where the utility is located and operated by representatives for the governorates served by the utility.

Article XVI

Actions are to be taken to transfer some slected personnel engaged by each of GOGCWS and G/GOSD to NOPWASD through a Minister of Housing decision; while maintaining all their fringe benefits. Required arrangements ought to be done to transfer their salary-grades to NOPWASD's budget, upon agreement with the Central Agency for Organization and Administer and the Minister responsible for finance.

Article XVII

This Presidential Decree is to be published in the official Gazettee, and to be operated on the date of publishment. The Minister for Housing has to issue all decisions needed for implementation.

Translation by Dr. Nabil Saba

Comments on Presidential Decree No. 197 of 1981 for Establishing NOPWASD

1. NOPWASD is not explicitly authorized to restructure the water tariff. This authority can only be inferred from item 4, Article 4.

2. There are no structured charges or regulations governing the fees to be collected by NOPWASD for its services to the governorates. (Items (i) and (iii) of Article 8 and item (vii) of Article 2.)

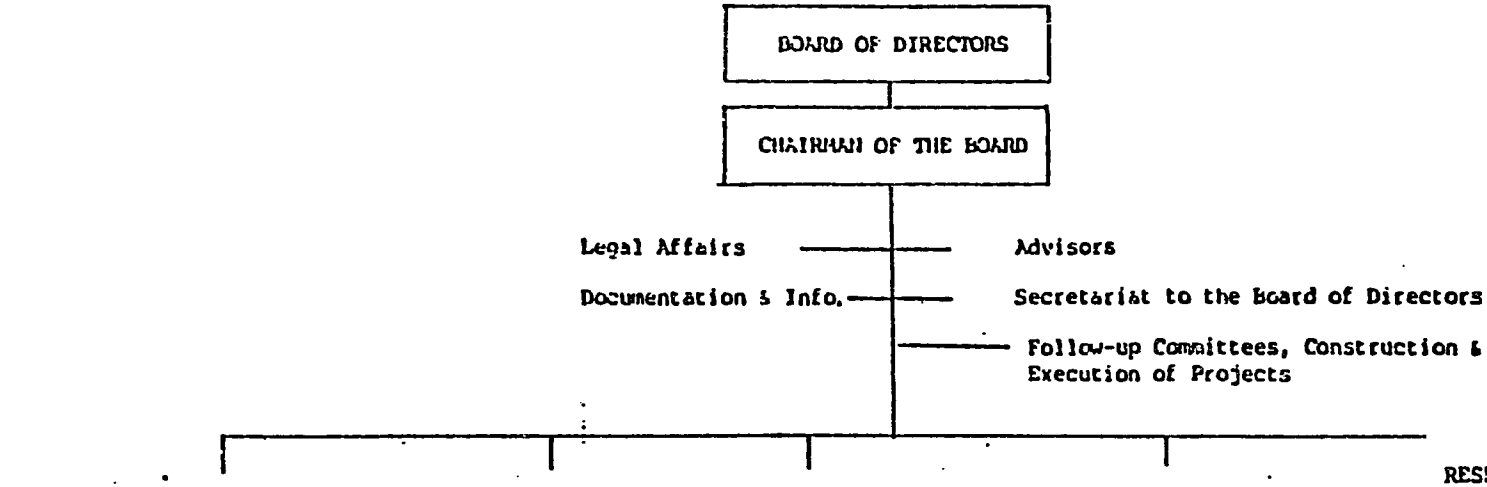
3. No arrangement has been made for representation of the governorates on NOPWASD's Board of Directors. Therefore, the viewpoints of concerned governorates' for water and wastewater schemes may not be fully taken into consideration by NOPWASD.

4. No criteria have been mentioned to help identify large water projects whose ownership could be conferred upon the governorates by the decision of the Minister for Housing.

5. Rules and procedures, that would help the concerned governorates to share management of operations and maintenance of joint water projects, are missing.

(See Exhibit 1 below, organizational structure, NOPWASD.)

NATIONAL ORGANIZATION FOR POTABLE WATER AND SANITARY DRAINAGE



C.4 C/GOSD

The Presidential Decree No. 133 of 1981 Establishing
The General Organization for Sanitary Drainage in Greater Cairo

I Name:

Article 1 - A general public organization is established under the name "The General Organization for Sanitary Drainage in Greater Cairo" at Cairo city with a juristic personality, and affiliated to the Cairo Governor.

II Purpose, Authority and Responsibility:

Article 2 - The General Organization is the body responsible for projects and activities of wastewater and sanitary drainage in Greater Cairo; it is authorized to manage and operate sanitary drainage installations and wastewater within its service area. It has the following authority and responsibilities:

1 - preparing general and detailed plans for wastewater and sanitary drainage projects and activities inside Greater Cairo;

2 - managing, operating and maintaining the santiary drainage utility installations in Greater Cairo, making required extension and development and procuring needed material and equipment;

3 - conducting studies, including economic and financial studies and performing empirical research for wastewater and sanitary drainage, developing designs, conditions and specifications and preparing contracts;

4 - advertising projects on a bidding basis, entering into local and foreign negotiations, and concluding contracts and supervising their implementation;

5 - applying the stipulations of the Law of Drainage of Liquids to the wastewater and public drainage systems; and

6 - associating with concerned bodies in developing standards for drainage of liquids.

III The Management System:

Article 3 - The Board of Directors is the supreme body vested with principal authority for conducting the organization's activities and affairs. The Board is empowered to take required actions to realize objectives, especially:

1 - mapping out general policy, within the framework of the national policy;

2 - designing plans, projects, and works undertaken by the organization and compiling related implementation schemes;

3 - setting regulations for employing local and foreign technical consultants, and determining compensations that would be paid to them;

4 - issuing executive regulations connected with financial and administrative affairs for the General Organization and its personnel within the framework laid by related laws;

5 - approving the annual budget estimates and the final accounts as well as the planned budget;

6 - formulating a training system for increasing productivity;

7 - concluding loans/agreements according to the law;

8 - accepting donations and grants;

9 - examining periodic reports, explaining work-progress and financial position; and

10 - considering the points made by the concerned Governors or the Chairman of the Board.

The Board of Directors may delegate some of its rights to the Chairman or a committee formed of its members. It may also authorize one of its members or one director to undertake a certain job.

Article 4 - The Board of Directors may decide to render similar services outside its service area on behalf of other government agencies or local government units. In carrying out this prerogative related Laws and regulations are to be observed.

IV Constitution of the Board of Directors

Chairman of the Board	Chairman
Two of C/GOSD's Heads of Sectors to be nominated by the Governor of Cairo on the proposal of the C/GODS's Chairman:	Members
Head of the Legal Counselling Department of the Council of State	"
Representative of GOGCWS nominated by Cairo Governor	"
Representative of NOPWASO nominated by the Minister for Housing	"
Representative of Cairo Governorate nominated by the Governor of Cairo	"
Representative of the Ministry for Health chosen by the Minister	"
Representative of the Minister for Irrigation chosen by the Minister	"
Representative of Giza Governorate chosen by the Governor	"
Representative of Kalyubia Governorate nominated by the Governor	"
Two experts in sewerage and sanitary drainage nominated by Cairo Governor for two years' tour that could be renewed	"

V Decision Taking Process

Decisions have to be sanctioned by Cairo Governor who should receive it a week after being issued. Approval has to be made within seven (7) days. After a lapse of thirty (30) days without disapproval they are considered approved.

VI Revenues: Composed of:

(a) revenue generated by activities performed
(b) appropriations made through the annual budget
(c) donations accepted by the Board
(d) loans borrowed within legal stipulations and regulation

VII Money owned by the organization is considered public money.

VIII Budget

The General Organization has a separate budget independently managed and prepared according to the rules governing the State Budget. It has to have final accounts.

C/GOSD
(based on Presidential Decree No. 133 of 1981)

I. Constitution Board of Directors

• Chairman of the Board	Chairman
• Two of C/GOSD's Heads of Sectors To be nominated by the Governor of Cairo on the proposal of the C/GOSD's chairman	Members
• Head of the Legal Counselling Department of the Council of State	"
• Representative of GOGCWS nominated by Cairo Governor	"
• Representative of NOPWASD nominated by the Minister for Housing	"
• Representative of Cairo Governorate nominated by the Governor of Cairo	"
• Representative of the Ministry for Health chosen by the Minister	"
• Representative of the Minister for Irrigation chosen by the Minister	"
• Representative of Giza Governorate chosen by the Governor	"
• Representative of Kalyubia Governorate nominated by the Governor	"
• Two experts in sewerage and sanitary drainage nominated by Cairo Governor for two years' tour that could be renewed	"

II. Decision-Taking Process

Decisions have to be sanctioned by Cairo Governor who should receive it a week after being issued. Approval has to be made within seven (7) days or elapsing of thirty (30) days without disapproval.

III. Revenues: composed of:

(A) Revenue generated by activities performed
(B) Appropriations made by the annual budget
(C) Donations accepted by the Board
(D) Loans borrowed within legal stipulations and regulations

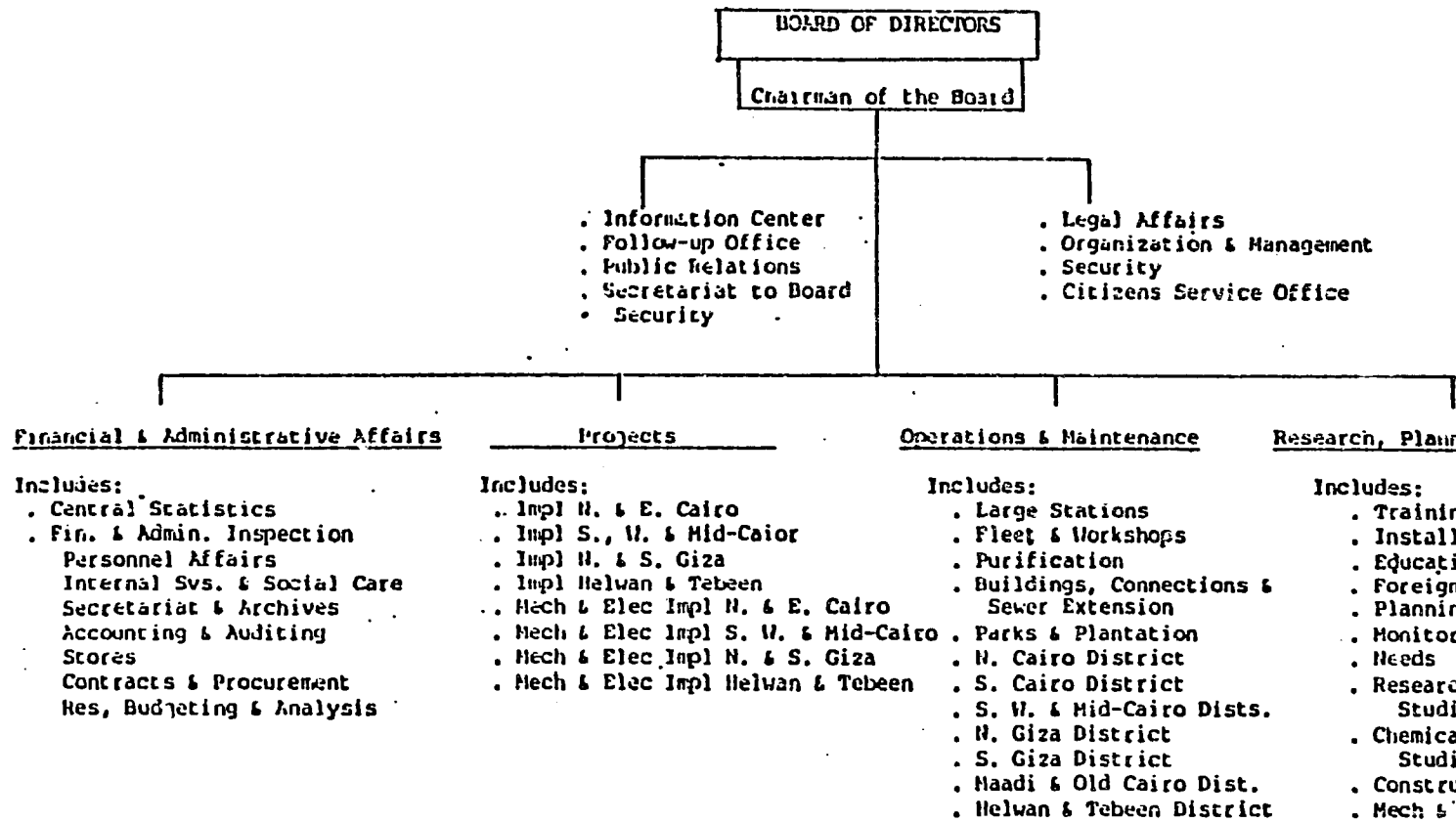
IV. Money owned by the organization is considered public money.

V. Budget

The General Organization has a separate budget independently managed and prepared according to the rules governing the State budget. It has to have final accounts. Pro forma budget is approved by the Board of Directors.

See Exhibit 2 below, C/GOSD organizational structure.

CAIRO GENERAL ORGANIZATION FOR SANITARY DRAINAGE



C.4 - 7

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C.5 CWO

OUTLINE PRESIDENTIAL DECREE

THE PRESIDENTIAL DECREE NUMBER ... FOR THE YEAR 1982 TO ESTABLISH THE CAIRO WASTEWATER ORGANIZATION (CWO)

President of the Republic
After reviewing the Constitution
- and the law etc.

has decided:

In order that the Greater Cairo Wastewater Project (GCWP) should be effectively and efficiently implemented, the following revisions to existing laws and new laws shall be made.

Clause 1

The following decrees shall be revoked:

- decree of Minister of State for Reconstruction, Housing and Land Reclamation, Number 497, for the year 1981 (Issued on Eighth August 1981),

- decree of the Minister of State for Reconstruction, Housing and Land Reclamation, Number 59, for the year 1982 (issued on Sixth February 1982).

Clause 2

An Executive Organization, namely "The Cairo Wastewater Organization" (CWO), is to be formed to implement those elements of the Greater Cairo Wastewater Project (the project) falling within its allocated scope of work.

The CWO shall be an Executive Organization subject to the general direction of the Ministry of Reconstruction, Housing and Land Reclamation (the Minister). All decrees and regulations affecting executive departments for reconstruction shall appply to the CWO unless otherwise provided in this decree.

Clause 3

The Cairo Wastewater Organization shall investigate, propose and draw up policies, plans and technical and financial programs for the project; supervise implementation; and coordinate these plans and programs with the plans of other agencies involved in the project. In particular, CWO shall carry out the following duties:

- conduct studies and technical, economic and financial investigations mandatory to the project,

- contract with foreign and local consultancy offices according to the approved internal regulations for reconstruction,

- specify the technical conditions, standard specifications and designs, and approve them,

- prepare contracts for the works according to specifications and conditions; solicit local and international tenders; and negotiate, analyse, adjudicate tenders and award contracts,

- execute the works and projects or supervise their execution if the wrks are awarded to others. Also, commission the supervision of execution of the project to whoever (sic) the organization may select after approval by the Minister,

- follow up execution of the project according to the technical specification, time schedules and financial programs. Evaluate the work executed and solve any problems encountered during execution whether technical or financial, or because of any links to the scope of interest or other Ministries or agencies (see Clause 7).

- commission, if necessary, some of the works to other Ministries, companies or consultants or others (considering the project's interest),

- procure the necessary supplies, articles and equipments for the execution of the project either from local market sources or by importing,

- prepare planned budgets and programs for the finance of the project to warrant the supply of the project's financial requirements for foreign and local currencies according to the programs and plans for execution of the project,

- carry out the formalities of acquisition of land necessary for the project,

- take the necessary steps to hand over the completed projects and installations to the "General Organization of Sanitary Drainage Utility of Greater Cairo" (GOSSD) who shall then be responsible for their management, operation, maintenance and costs thereof.

Clause 4

1. The Cairo Wastewater Organization is formed from the following main organizational departments:

- the head of the department,
- projects and technical department,
- finance department,
- administrative and property acquisition department,
- and other departments that may prove necessary.

2. CWO is to establish its own system for the salaries, incentives, allowances, pensions and other benefits for its employees. This system should suit the nature of the organization's activity.

3. CWO is to have an independent budget according to the regulations applied in the State balance of payments. The Head of CWO or his delegated authority shall supervise the organization's budget preparations and submit it to the Management Board (see Clause 5) in due time for approval.

Clause 5

1. A Management Board (the Board) shall be formed for the Cairo Wastewater Organization. The Board shall comprise:

- the Head of CWO (as Chairman),
- A senior representative from the Ministry of Reconstruction, Housing and Land Reclamation,
- three senior managers from other public or private sector organizations who have considerable experience of the management of very large civil engineering projects (to be appointed by the Supreme Committee to CWO on the recommendation of the Minister),
- an expatriate financial advisor to CWO (non-voting),
- the project director of the consulting engineers to the project (non-voting)

2. The Head of CWO (as Chairman) shall have the deciding vote should the Board be tied. He shall also have the power to co-opt special advisors (non-voting) to the Board.

3. The Board shall meet monthly -- more often should circumstances demand it -- and whenever a meeting shall be called either by the Head of CWO or the Minister.

Clause 6

1. The duties of the Board shall be to act as a technical secretariat to the Supreme Committee of CWO. It shall take, within the general direction of the policies laid down by the Supreme Committee, all

executive decisions for the implementation of the GCWWP within planned program and budget. It may delegate to the Head of CWO, his senior staff, consultants or advisors, the authority to act on its behalf within limits to be specified by the Board.

2. In particular, the duties of the Board shall include:

- to receive, consider and amend where necessary, the project's independent five-year financial plans and programs and annual programs and budgets, prepared for the project by CWO, its consultants and advisors,

- to submit the project's plans, programs and budgets for approval to the Supreme Committee prior to the Committee submitting the same (for the Government's endorsement) to the First Deputy Prime Minister,

- to make arrangements, on behalf of CWO, and within financial plans, with the National Investment Bank of Egypt to ensure the availability of funds as required by the project's approved program,

- to seek and receive advice on behalf of the CWO and the project, from the Ministries of Planning, Finance, Economy, and Investment and International Cooperation, to ensure effective planning and execution of the project,

- to receive monthly (and special quarterly) reports from the Head of CWO comparing progress against planned program and budget and to issue directives to CWO as a result of their review of these reports,

- to submit quarterly reports (or as required) to the National Investment Bank of Egypt in a manner to be agreed by CWO with the Bank,

- to submit to the Supreme Committee, once every six months, a report dealing with the activities of CWO (and its technical consultants and advisors) during the previous six or twelve months. This report shall include analysis of progress to date on the project and recommended changes (if any) to future plans and budgets in the light of this progress,

- to implement major policy decisions and project priorities deciced by the Supreme Committee,

- to receive and review tender analyses and recommendations prepared by CWO, its consultants and advisors; and to award contracts within planned program and budget (or as they have been amended by the Supreme Committee),

- to authorize the Head of CWO (or his delegated authority) to commit expenditure and make payments within the annual program and budget for the project (or as the Board should otherwise approve),

- to make arrangements for an annual audit, by an external professional auditor, of the financial transactions, books and records of the CWO; and to present the audited accounts to the Supreme Committee for endorsement,

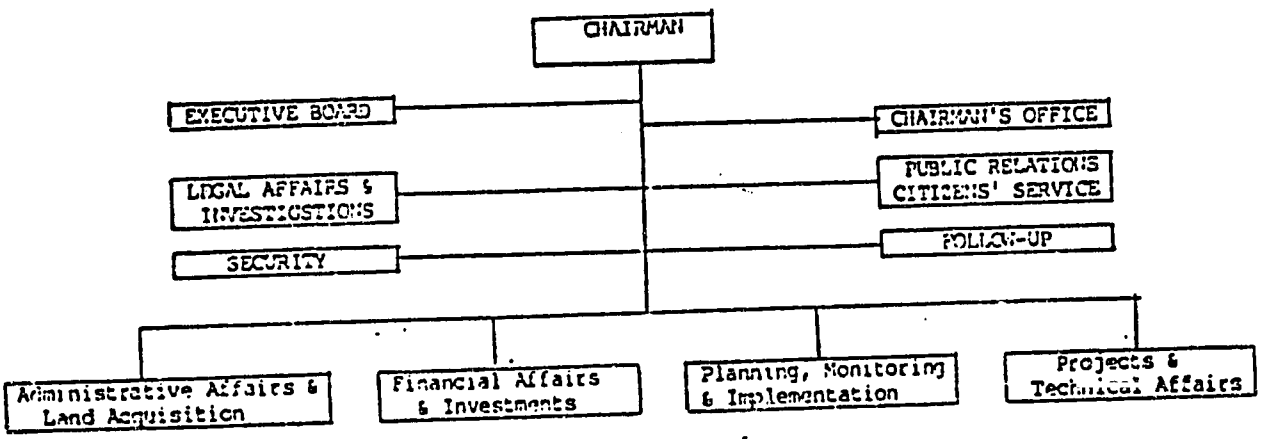
- to generally represent to the Supreme Committee, and hence to the First Deputy Prime Minister, the needs of CWO to ensure the effective and efficient implementation of the GCWWP.

Clause 7

The works and projects which are within the scope of CWO but which also are linked to the works and/or requirements of other Ministries and agencies, shall be subject to consideration and review by an "Executive Committee of the Project".

See Exhibit 3 below, CWO organizational structure.

CAIRO WASTEWATER ORGANIZATION



ludes:
Funding & Investment
Financial Affairs
Supply

Includes:
. Implementation
. Technical Equipment,
. Maintenance & Fleet

Includes:
. Design & Survey
. Specif. & Costs
. Bids & Contracts

C.6 A/GOSD

Decree of th. President of the Arab Republic of Egypt
No. 363 of 1979

Establishment of Alexandria General Organization (1) for Sanitary Drainage (A/GOSD)

The President of the Republic:

- Pursuant to the Constitution;

- To the Law No. 93 of 1962 regarding the disposal of liquid wastes;

- To the Law on General Organizations issued by Law No. 61 of 1963;

- To the Presidential decree No. 1637 of 1968 on the establishment of the General Organization for Sewerage and Sanitary Drainage and;

- To the Law on the Local Government System issued by Law No. 43 of 1979;

- And to the Presidential Decree No. 335 of 1979

Has Decided:

Article I: A general Organization shall be established bearing the title "Alexandria General Organization for Sanitary Drainage" and shall have the judicial personality under jurisdiction of the Governor of Alexandria. The headquarters of the Organization shall be Alexandria City and the provision of the General Organization Law shall be applicable upon this Organization.

Article II: A/GOSD shall be responsible for the general services for sewerage and sanitary drainage in Alexandria Governorate with the following responsibilities:

1. Manage, operate and maintain the Alexandria sewerage system. This also includes any required expans. or rehabilitation and acquisition of all necessary materials and equipment.

2. Prepare general and detailed sewerage and sanitary drainage projects for the Alexandria Governorate.

(1) The Arabic word more strictly translates to "Authority" but the term "Organization" seems to be more commonly used by the Cairo and Alexandria sewerage utilities.

3. Conduct research and applied studies for sewerage and sanitary drainage and prepare designs, standard and technical specifications, and project contracts.

4. Invite tenders, both local and foreign, for projects, and sign contracts and administer their implementation.

Article III: A/GOSD Board of Directors shall be the supreme authority and shall take any necessary actions and decisions to carry out the responsibilities for which A/GOSD has been established, particularly the following:

1. Recommend general policy for the Organization.

2. Recommend plans, projects and services to be undertaken by the Organization and establish relevant implementation programs.

3. Establish the general conditions under which the sewerage and sanitary drainage projects are to be conducted, as well as approve the results of research.

4. Issue internal regulations and make organizational decisions relevant to financial and administrative affairs of the Organization and its employees.

5. Establish a training program to increase productivity.

6. Approve the Organization's annual budget and final accounting statement.

7. Review periodic progress reports and financial status of the Organization.

8. Enter into loan agreements in accordance with law.

9. Consider any matter related to the Organization's responsibilities presented by the Governor or the Chairman of the Board.

The Board may assign some of its duties to the Chairman or to a committee formed from its members. The Board also may assign one of its members or Directors to undertake a specific mission.

Article IV: If requested, the Organization may carry out its activities outside the Governorate of Alexandria.

Article V: The Board shall be formed as follows:

- The Chairman - whose appointment and salary are to be decided by the Prime Minister
- Technical General Director
- Financial and Administrative General Director
- Undersecretary of Ministry of Housing in Alexandria
- Undersecretary of Ministry of Health in Alexandria
- The Legal Advisor of the Governorate of Alexandria
- Water Authority Vice Chairman for Technical Affairs
- Two members (maximum) with considerable experience in sewerage and sanitary drainage are to be selected by the Governor of Alexandria for a term of two years.

Article VI: The Board shall convene at least once a month at the invitation of the Chairman, and whenever the Governor or Chairman find it necessary. The Governor shall preside over any Board meetings he attends. Board meetings shall not be legal unless attended by the majority of its members. Decisions shall pass by the majority of Board members present. When votes are equal, the side comprising the Chairman shall have priority. In case of the Chairman's absence, the meeting and its sessions shall be presided over by the senior Director, and all minutes and decisions shall be recorded to be signed by the Chairman.

Article VII: The Chairman shall report to the Governor the Board's decisions, within seven days from the date of the issuance of the minutes, for his approval, except those decisions which require the approval of a different authority.

Article VIII: The Chairman shall be responsible for directing the Organization in accordance with the provisions of the Law of General Organizations, and shall be responsible for the execution of its general policy and established goals, as well as the implementation of the Board's decisions. The Chairman shall also have the right to delegate to one or more Directors some of his duties. The Chairman shall represent A/GOSD in its relations with others and before the courts.

Article IX: A/GOSD resources shall be financed from the following:

1. Returns from its direct activities.
2. Allotments vested in its name in the National Budget.
3. Grants and gratuities accepted by the Board.
4. Loan agreements within Law provisions.

A/GOSD's money is public money in all aspects.

Article X: A/GOSD shall have an independent budget, rules of which should be drawn in accordance with the law of the general National Budget. It shall also have its own final accounting statement. The Chairman or his delegate shall prepare the draft budget and submit it to the Board for approval at the scheduled dates.

Article XI: Auditing and supervision of A/GOSD accounts shall comply with the provisions of laws and decisions on auditing and supervision of accounts in general organizations.

Article XII: A/GOSD employees shall fall under provisions of National employees. The Board may add other systems to suit its nature and activities.

Article XIII: Employees working in maintenance, operation and projects departments in Alexandria under the General Organization for Sewerage and Sanitary Drainage shall be transferred to A/GOSD and all necessary procedures shall be taken regarding their grades, allotments, bonuses, etc., which are to be transferred to the A/GOSD budget. All allotments assigned to A/GOSD in the budget of the General Organization for Sewerage and Sanitary Drainage shall be transferred to it as decided by agreement between the Ministers of Finance and Housing.

Article XIV: All money, belongings, rights and obligations, pumping stations, sewers and other items of the General Organization for Sewerage and Sanitary Drainage shall be come the property of A/GOSD.

Article XV: To obtain is rights, A/GOSD shall take all administrative acquisition procedures in accordance with the provisions of administrative acquisition law.

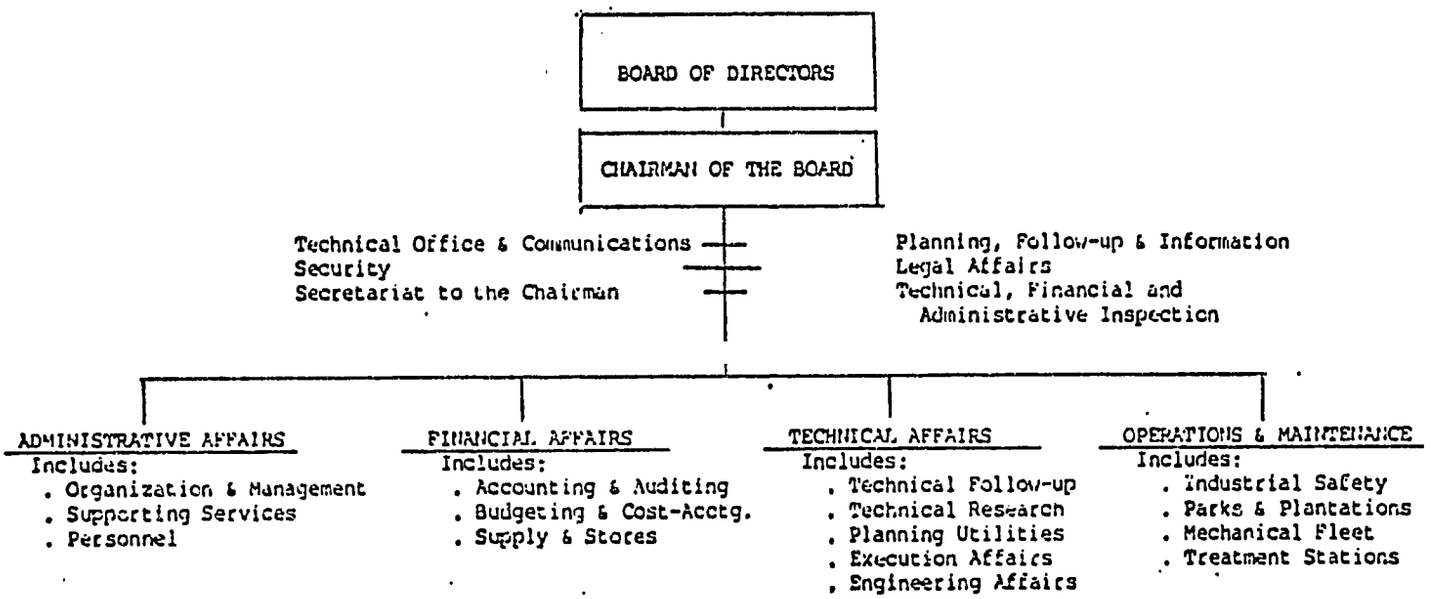
Article XVI: Work shall proceed in compliance with the current systems, regulations and applicable decisions of the General Organization for Sewerage and Sanitary Drainage and its employees, until A/GOSD replaces them, in accordance with the provisions of this Decree.

Article XVII: This Decree shall be published in the Gazette and shall come into effect from the date of notice in the Gazette.

Issued by the Presidency of the Republic on Ramadan 28, 1399 (August 21, 1979).

Hosni Mobarak
Vice President

ALEXANDRIA GENERAL ORGANIZATION FOR SANITARY DRAINAGE



C.7 GOGCWS

GENERAL ORGANIZATION FOR GREATER CAIRO WATER SUPPLY (GOGCWS)

ORGANIZATION

It is proposed that consideration be given to establishing a public sector company structure for GOGCWS. The BVI-ATK report, Management System, Organizational Manual, October 1979, proposed that GOGCWS could attain more effective and efficient service by reorganizing its structure. (See Exhibit 5 for organizational structure as proposed by BVI-ATK.) The BVI-ATK structure suggests the following major changes compared to the present organizations:

- Establishment of five sectors (Administration, Finance, Customer Service, Operations and Technical) rather than two.

- Consolidating all activities involving customer contact into the Customer Service Sector.

- Reassigning and consolidating the staff groups that report to the Chairman.

- Combining the present revenue departments with the connections and meter replacement responsibilities of the Distribution Department (formerly Networks) to form the Customer Service Sector.

- Addition of a Training and Management Development Department and upgrading of the Personnel Department.

- Establishing Asset Accounts to control all financial transactions involving fixed assets.

- Establishing a Maintenance Department directly under the Vice Chairman, Operations.

- Reducing the rank of the Distribution Department from a sector to a General Department in light of its reduced responsibilities.

Functional and job descriptions to support the organizational structure are referenced in the BVI-AIK report.

STAFFING

The minimum stffing levels for GOGCMS under the new organizational structure are summarized below:

MINIMUM STAFFING LEVELS IN 1980 FOR GOGCWS

Department	Actual[1] 1978	Needed 1980
Chairman's Office	54	100
Administration	463	355
Finance	242	137
Customer Service		
Reading, Billing Collections	461	267
Connections, Meter Service	(2)	278
Operations		
Production	3,352	1,508
Distribution	1,801[2]	685
Facilities and Maintenance	(3)	334
Laboratories	(3)	96
Technical	108	314
Unaccounted[4]	1,904	0
Total	8,885	4,074

Notes:

(1) GOGCWS was not able to supply detailed staffing data by department by job title in time to include in this Manual. These data were supplied earlier from payroll listings.

(2) Data did not permit division of existing Networks Department personnel between the new Customer Service Department and the new Distribution Department.

(3) Data did not permit separation of Facilities and Maintenance and Laboratories personnel from Production Department personnel.

(4) The department data supplied by GOGCWS do not add to the actual number of personnel said to be employed.

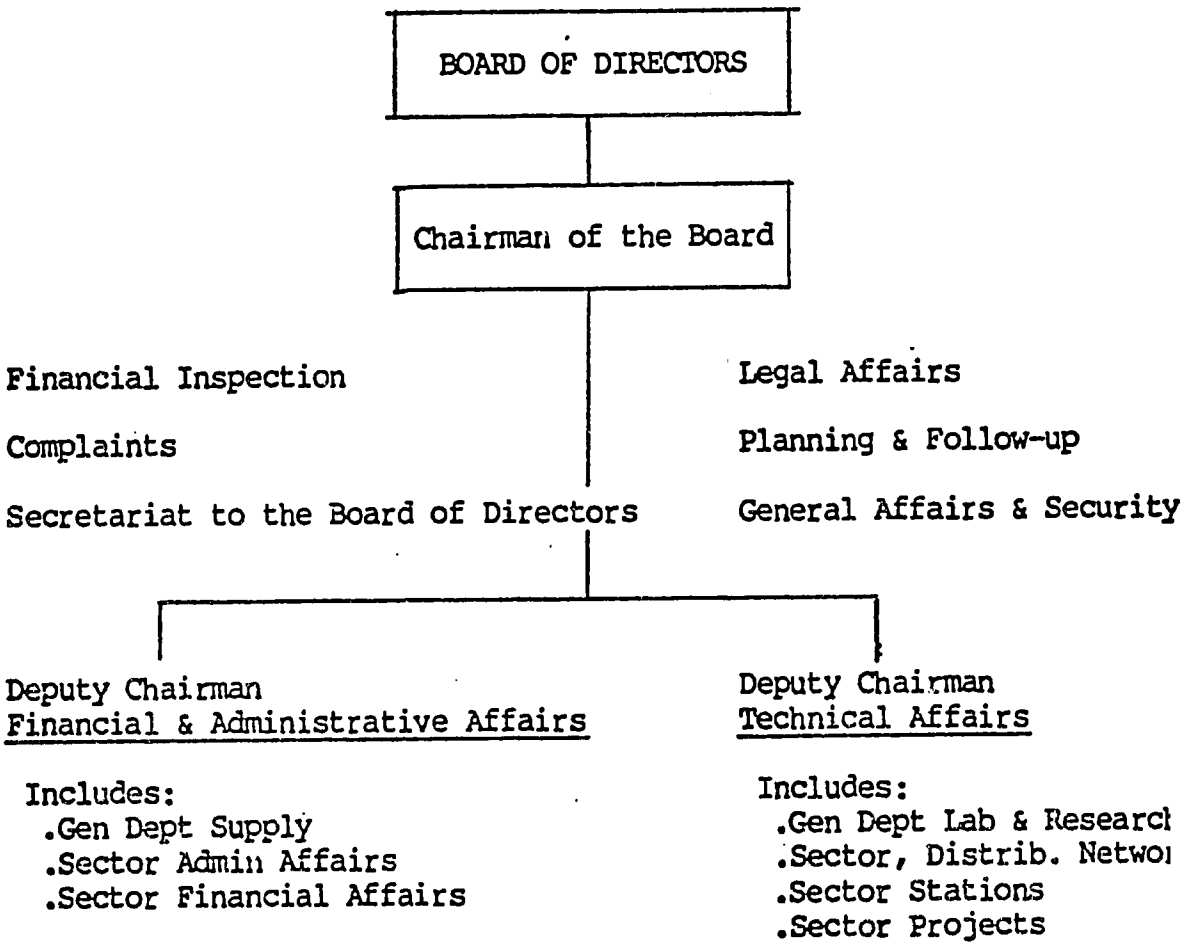
These estimates are based on the following assumptions:

- ES-Parsons recommendations for plant shift personnel are appropriate.
- At least one technician is always on duty at each plant laboratory.
- An average of 110 pipeline breaks are reported per day.
- Capital expenditures will average LE 77 million per year from 1980 through 1983.
- Customers' meters will be read (not estimated) and bills prepared every two months. Large customers will be billed monthly.
- Work will begin on acquiring a new computer system but in the meantime the present system will be used.
- A new cost accounting system will be installed.

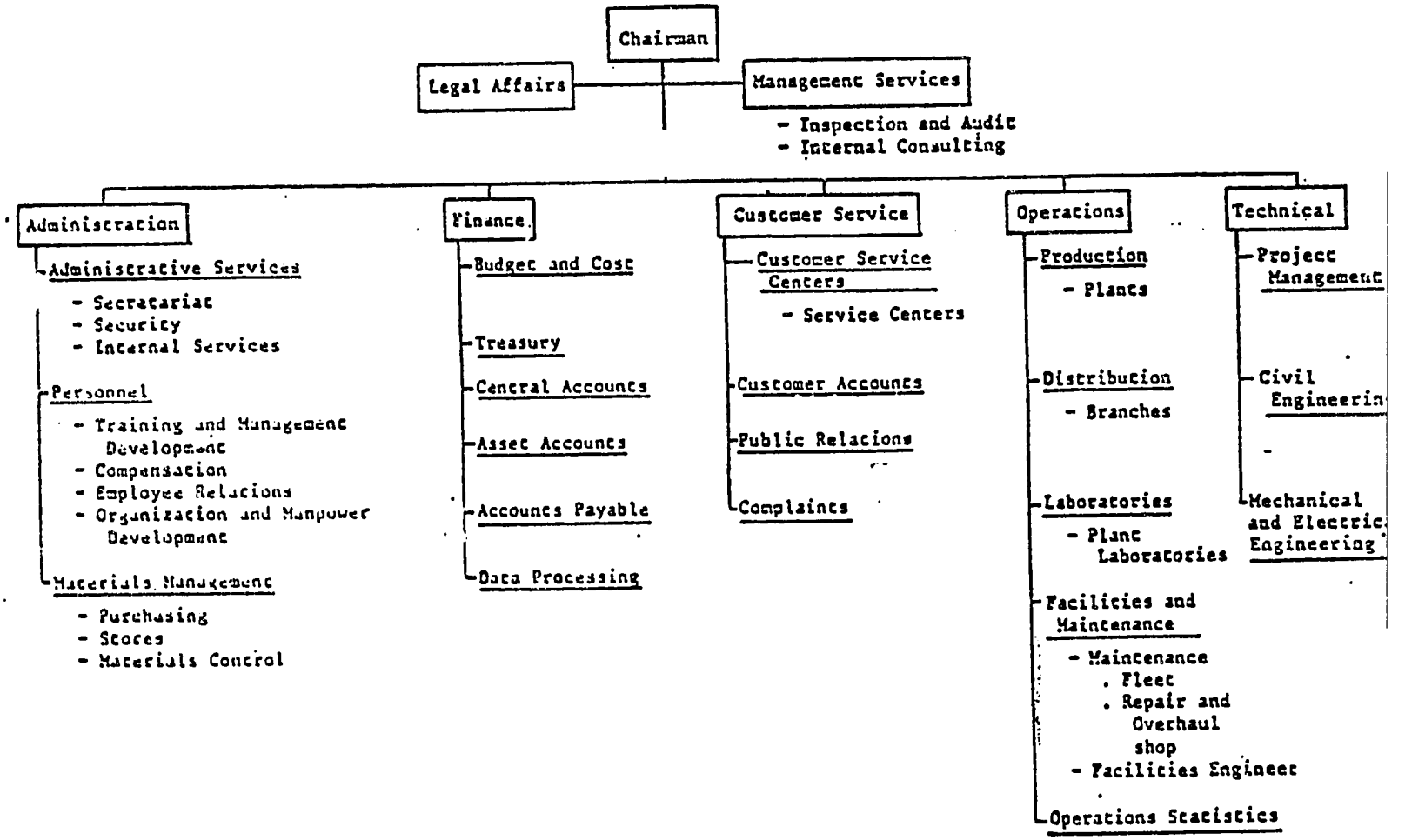
These data show substantial overstaffing in every department except Technical. There appear to be twice as many people as required in production and distribution. If such double teaming is required because of incompetent people (as suggested by many managers), training programs could have large and immediate paybacks in personnel costs.

It is suggested that the BVI-ATK recommendations be reviewed and updated in terms of developing a public sector company structure for GOGCWS. (Also see below, Behera Water Company structure.)

GENERAL ORGANIZATION FOR GREATER CAIRO WATER SUPPLY



ORGANIZATION CHART -
GENERAL ORGANIZATION FOR GREATER CAIRO WATER SUPPLY
PROPOSED BY BVI-ATK ASSOCIATES Oct. 1979



C.8 AWGA

ALEXANDRIA WATER GENERAL AUTHORITY

ORGANIZATION

It is also proposed that consideration be given to establishing a public sector company for AWGA similar to that being proposed above for GOGCWS. The BVI-ATK Report, Management Systems, Organizational, March, October 1979, proposed that AWGA could benefit by reorganizing its structure. See Exhibit 6 for existing organizational structure of AWGA and Exhibit 7 for BVI-ATK proposals. The BVI-ATK proposal structure recommends the following major changes compared with the present structure:

- Establishing five sectors (Administration, Finance, Customer Service, Operation and Technical) rather than two
- Consolidating all activities involving direct customer contact into a new Customer Service Sector
- Reassigning and consolidating the staff groups reporting to the Chairman
- Adding a Training and Management Development Department and upgrading the Personnel Department
- Establishing Asset Accounts to control all financial transactions involving fixed and physical assets
- Establishing a Maintenance Department directly under the Vice Chairman, Operations
- Establishing the Western Desert as a General Department reporting to the Vice Chairman, Operations

Functional and job descriptions to support the organization structure are referenced in the BVI-ATK report.

STAFFING

The minimum staffing levels for AWGA under the new organization structure are summarized below.

MINIMUM STAFFING LEVELS IN 1980 FOR AMGA(1)

Department	Number of People Actual 1979	Number of People Needed 1980
Chairman's Office	81	63
Administration	768(3)	265
Finance	100	73
Customer Service	1,078	516
Operations		663
Plants)	936	177
Maintenance)		50
Laboratories)	96(4)	98
Distribution (Networks)		
Western Desert	149	163
Technical	99	149
Total	3,307	2,217

Notes:

(1) Assumptions include:

- Manshia extension is not staffed in 1980.
- Changeover to NCR 499 type billing machines is made.
- Meters are read and bills prepared every two months for all but large customers.
- New accounting system is installed.
- LE 15 million is spent for projects.

(2) A fully accurate count was never obtained.

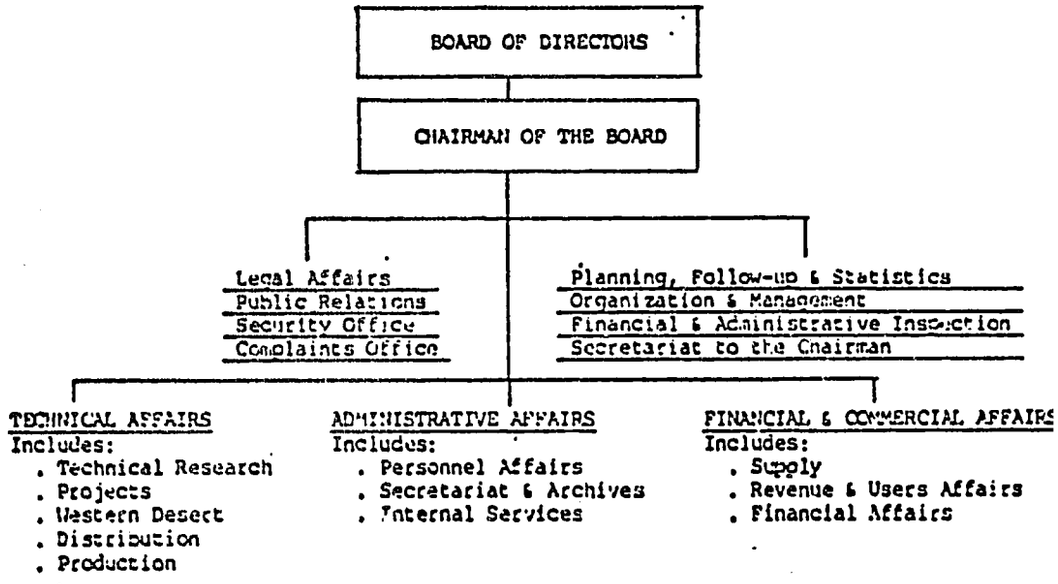
(3) Includes all guards, drivers and messengers whereas these are assigned by sector in the needed staffing.

(4) Of the personnel presently in this Department, 297 were assigned to Customer Service as it appears they are performing that type of work.

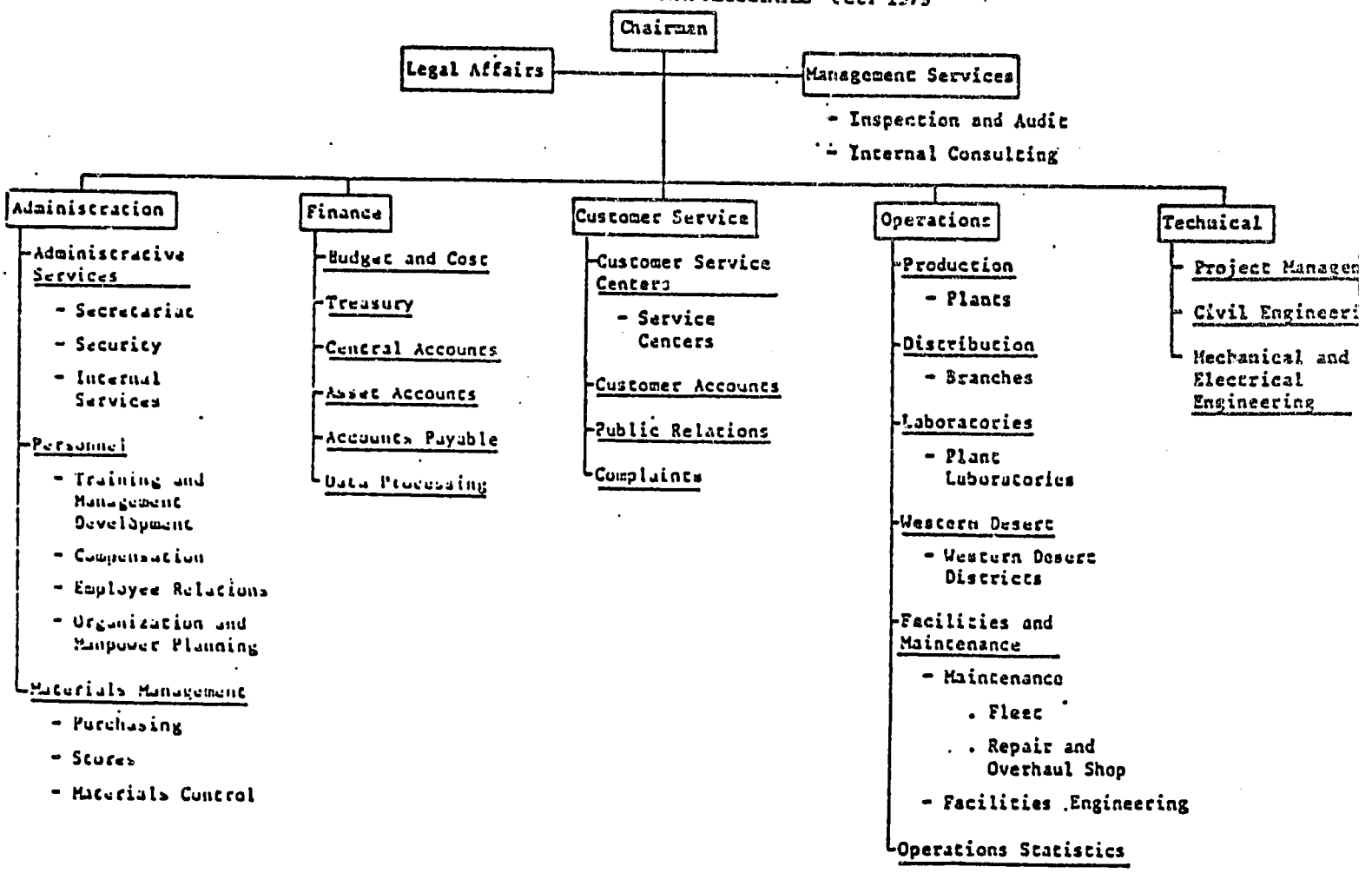
The data suggest that AWGA has about 50% more staff than required. The existing Networks (Customer Service), Revenues and Security Departments have the largest numbers of excess personnel.

It is suggested that the BVI-ATK recommendation be reviewed and updated in terms of developing a public sector company structure for AWGA. (Also see below, Behera Water Company Structure.)

ALEXANDRIA WATER GENERAL AUTHORITY



ORGANIZATION CHART -
ALEXANDRIA WATER GENERAL AUTHORITY
PROPOSED BY BVI-ATK ASSOCIATES Oct. 1979



C.9 Behera Water Co.

The Behera Governor's Decision No. 198 of 1981
Establishing The Behera Water Company

Behera Governor: After looking at:

- The Law No. 16 of 1954 specifying regulations for public companies;

- The Law No. 61 of 1963 of the General Organizations;

- The Law No. 60 of 1971 of the Public Enterprises and Public Companies as amended by the Law No. 111 of 1975 and the Law No. 112 of 1976;

- The Law No. 73 of 1973 determining conditions for electing workers' representation on the Board of Directors of Public Sector Companies and Public Companies;

- The Law No. 43 of 1979 of the Local Government System;

- The Presidential Decree No. 1636 of 1968 establishing the General Organization for Drinking Water;

- The Cabinets' Approval on March 18, 1981; and

- The Minister for Development and New Communities and the Minister of State for Housing and Land Reclamation's Decision delegating authority to the Behera Governor for deciding on the establishment of the Behera Water Company

It is decided

Article 1 - An Egyptian Public Company affiliated to Behera Governorate is established according to the laws organizing public sector companies as well as this decision and attached by-laws.

I Article 2 - Name: This company's name is "The Behera Water Company, one of the companies of Behera Governorate".

Purpose:

II Article 3 - This company's purpose is to produce and distribute drinking water throughout Behera Governorate; it is responsible for operating, maintenance and renovating production units, distribution network and other belongings so as to enable realization of this purpose according to rates and standards of performance predetermined by the competent central body.

In assuming its responsibility, the company has to comply with technical engineering, and health principles as well as sound economic performance.

The company may participate in any form with other organizations and companies functioning in similar activities, or that might associate with it in realizing its objective, whether located in the United Arab Republic or abroad. (It may, also, procure it and/or superordinate it.)

III Authority/Responsibility

Article 4 - To achieve its aim, the company is invested with the following rights and discretions:

- deciding on the rate collected from the customers for its services within the guidelines made by the concerned (competent) central body. This includes a charge against private and public connections, inspections, tests, using meters, etc.

- determining the price for selling water on a sound economic basis after getting the consent of the competent (concerned) central body;

- collecting the value of consumed water according to the tariff set by the authorized body;

- the concerned central body may collect the companies' monies through administrative procedures. In this it may seek the help of other government bodies and local government units but on a free-of-charge basis;

- collecting the value of water distributed throughout the company's service area according to agreements concluded with water users;

- accepting technical assistance, grants-in-aid and donations presented by foreign or national bodies, after taking related legal arrangements;

- proposing acquisition of land for projects undertaken by the company; in this the law regulating legal acquisition of property for the public good has to be applied;

- supervising private water sources and notifying their users if the quantity of the water exceeds pollution standards. The Behera Water Company may close down these sources if, in its opinion, they adversely affect public health.

IV The Management System:

Article 8 - Third Section

- The company is managed by a Board of Directors constituted of an odd number consisting of no less than seven (7) and no more than eleven (11) as follows:

1. A chairman appointed by the Prime Minister on the proposal of the Behera Governor; the Chairman represents the company in the courts.

2. Members - half of them are appointed by the Prime Minister including one nominated by the concerned central body; the remaining half is elected from among the company's personnel according to stipulations of the Law No. 73 of 1973.

- The Prime Minister may add to the Board some part-time members not exceeding two (2), to be selected from experts in the company's activities, or in economic, financial, managerial, or in legal matters. This decision should determine the award to be paid to each of them. They have no rights in the company discussions except in cases related to technical matters and/or issues connected with overall policies and plans.

V Discretionary Powers of the Board:

Article 9 - 1. preparing the overall pro forma plan;

2. preparing the budget estimates;

3. determining operational plans for production and ensuring control as to its quality, ensuring better resource utilization; and achieving increased production, efficiency and attainment of the company's goals;

4. designing the policy needed for increasing personnel productivity, realizing efficiency in operations, and regulating of work;

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5. developing the financial resources necessary for funding recurrent operations;

6. replacing and rehabilitating within related reserves, and deciding on expending items suiting operational plans and objectives predetermined for the company;

7. laying down the cost base of various products and setting performance standards;

8. styling the organization/management structure and the job structure;

9. setting the personnel plan, taking into consideration sound economic management principles;

10. implementing capital investment projects on schedule;

11. realizing estimated revenues and expenditures as indicated by the planned budget, and enceavoring to develop resources and decrease expenses;

12. organizing overtime work schemes;

I3. designing a training system for developing personnel serving new entrees and already employed ones throughout their career time.

VI Company's By-laws and Special Regulations:

Article 10- The Board of Directors compile internal regulations and other schemes required for organizing the company's work, management, financial activities and accounting system; with an aim at ensuring regularity and strengthening control. In this it may devise its generic rules; without adherence to present governmental procedures while responding to the company's managerial, financial and production considerations. The Public Sector Companies Law No. 111 of 1975

Comments on The Behera Water Company Established by the Governor's Decision No. 198 of 1981

1. Enabling Law:

The Behera Water Company is established according to the public sector companies Law No. 111 of 1975. It is supervised by the general organization NOPWASD established under General Organization Law No. 61 of 1963. This situation creates conflicts on operation and maintenance and tariff restructuring. It also creates a problem on revenue retention and autonomy in policy planning and implementation.

2. Controlling Body:

The Behera Company, established by a Governors' decision and working within the administrative area of Behera Governorate, necessarily submits to the monitoring and evaluation exercises carried out by the jurisdictional authority in Behera Governorate, i.e., the Governorate Local Popular Council. Article 12 of the Law of Local Government No 50 of 1981 item (X) entrusts the Governorate Local Popular Council with the discretion of approving the rules organizing the interface between the Governorates' Executive Agencies and the people in all fields and walks of life.

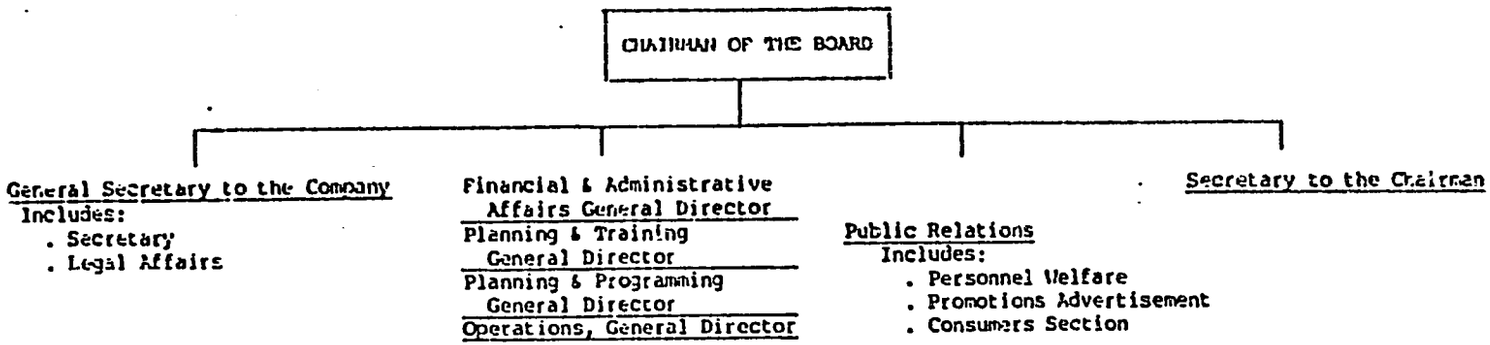
3. The Governors' Authority in Alteration of Water Tariff:

The Governor is invested with the rights/authorities of all ministers as specified by the laws and government regulations. He is considered to be the chief administrator of all local bodies and public utilities.

The Governor also enjoys the authority of the Minister (including the Minister for Housing) regarding decisions taken by the Board of Public Bodies operating public utilities functioning throughout the governorate.

Accordingly, the question arises; why shouldn't any proposed new water tariff rates for the Behera Water Company be approved by the Governor and legitimized (sanctioned) by the Governorate's Local Popular Council? At present, all new water tariff rates appear to have to be sanctioned by NOPWASD and approved by the Prime Minister's Office. (See Exhibit 8 below for Behera Water Company Structure.)

THE BEHERA WATER COMPANY OF BEHERA GOVERNORATE



C.9 - 7

3 Distribution Areas:

Abou Homouss, Hoseh Issa and Kafer El Dawar

Production Stations:

Abou Homouss, Kafer El Dawar, Bouseley, and Shoubra Kheit

ANNEX D

WATER AND WASTEWATER SECTOR FINANCING

D.1 SECTOR INVESTMENT PLANS

WATER AND SANITARY DRAINAGE INVESTMENT IN THE FIVE YEAR PLAN

Water and sanitary drainage (WSD) are classified in the public utilities group in the five year plan. Unfortunately the documents available at this time do not include a separate line for WSD. However, WSD amounted to 94.6 percent of the public utilities account in the 1978-82 plan, so it is probably safe to treat the public utilities category as interchangeable with water and sanitary drainage. Water received 49.7 percent of public utility expenditures and sanitation received 44.9 percent in the previous plan.

The proposed plan was prepared in Spring 1982 without the line item input of the various agencies that will actually invest resources. Thus, the initial cut at the plan is a statement of what level of resources can be garnered for investment and the amounts that will be allocated to each sector based on priorities for the next five years. At this point the plan does not reflect needs as specified by the WSD related agencies, though the People's Assembly has been discussing the plan the last several days and Al Ahram reports that a plan was adopted on January 13, 1983. The plan is still generally devoid of the WSD agencies input. For example, representatives of the Suez Canal Authority report that they have not submitted their plan yet.

Emphasis within the overall plan is on rehabilitation, renovation, and completion of projects currently underway. New projects are sought to the extent that they are complimentary to activities already underway.

The following discussion is based heavily on the proposed plan because details of the recently adopted plan as unavailable now. Total investment in the plan is set at LE 34077 million, of which LE 26077 million is public sector and LE 8000 million is private sector.[1] The commodity production sector is planned to receive 53.4 percent of investments, the services production sector 21.8 percent, and the social services sector (including public utilities) 24.8 percent. This budget, as with all budgets, is perceived as being very tight. Estimates are that LE 30000 million would be necessary simply to complete projects currently underway in the public sector so the plan will fail to achieve completion of these projects during the next five years, without considering new initiatives. This degree of limitation stresses the difficulty of making major realignments within the investment budget.

1. Al Ahram indicated that the People's Assembly increased the total to about LE 35500 million and the public sector share to LE 27200 million.

The 1982/83-1986/87 five year plan is for investment to comprise a relatively greater share of GDP as investment is planned for 26.0 percent of GDP after only 22.2 percent in the last five years (Rows A and B, Column 4, Table 1).[2] The public sector is expected to receive a slightly declining share of investment, but still more than three-fourths of the total (Column 5).

Public utilities investment is planned for a slight increase relative to total investment (Column 6) and a larger share of public sector investment (Column 7).[3] The public utility share of GDP is also planned to increase from 1.3 to 1.5 percent of GDP.

Public utilities was not among the list of social development services specified forgetting priority treatment in the proposed plan. Housing, education, health, and youth care were the social services mentioned. In a television interview on January 16, Minister Kafrawi indicated that WSD was a top priority item and the five year plan was for LE 3000 million plus donor support. The details of this amount are not known.

Row C in table 1 is designed to demonstrate the effects of the much talked about LE 3400 million five year plan for water and sanitary drainage. The investment reported in the tables includes LE 100 million for public utilities investment that is not for WSD. Note that the LE 3400 level is not in the proposed plan and the assumption here is that the level of total investment, public sector investment, and public utilities are each increased LE 1500 million to allow for the higher water and sewer investment[4].

The LE 3400 million WSD program represents a significant increase in relative WSD investment. WSD would absorb nearly 9.8 percent of total investment and 12.7 percent of public sector investment. The overall investment program would rise to 27.1 percent of COP in this case, with WSD absorbing 2.7 percent of GDP.

The important question is, can the resources be garnered to permit the planned investments? This issue can be approached from the economic perspective of the level of investment, from the governmental finance perspective of how to raise the public sector resources and from the perspective of the drain on foreign currency.

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2. Note that the time period considered as the previous five years, 1977-1981/82, is actually five and one half years.
3. The data available at this point does not specify whether Suez Canal water expenditures are classed with public utilities or the Canal Authority.
4. this is one explanation why the five year plan approved by the People's Assembly is LE 1500 million higher than the proposed plan.

TABLE 1

FIVE YEAR PLAN INVESTMENT BUDGETS[1]

TIME PERIOD	TOTAL INVESTMENT (1)	PUBLIC SECTOR INVESTMENT (2)	PUBLIC UTILITY INVESTMENT[2] (3)	1 GDP[3] (4)	2 1^2 (5)	3 1^3 (6)	3 2^3 (7)	3 GDP[3] (8
A. 1982/3-1986/7 (Plan)	34077	26077	1993	26.0	76.5	6.1	8.1	1
B. 1977-1981/2 (Preliminery actuals)	16836.6	13519.5	1016.7	22.2	80.3	6.0	7.5	1
C. 1982/3-1986/7 (Alternative)	35577	27577	3500	27.1	77.5	9.8	12.7	2

1. Totals for rows A and C are LE millions at 1981/2 prices. Totals for row B are LE million at current prices.

2. Percentages.

3. Water and sanitary drainage are included in the public utilities section. In the 1978-1982 plan. WSD was 94.6 percent of public utilities, so the sector is used as a surrogate for WSD. The LE 3500 is row C is the LE 3400 being discussed for WSD plus LE 100 for other public utilities.

From the economic perspective, the share of GDP targetted for investment is expected to rise relative to the previous five year plan (Column 4, Table 1). This rise may be greater than the data suggests because capital spending, at least for 1981/82, probably failed to reach the proposed level. One reason is that a pattern of spending under the investment budget appears to be emerging. For example, the NIB reported that 82 percent of investments funneled through it were actually spent in 1980/81. Also, many agencies were precluded from spending their entire investment budget in 1981/82, presumably as a strategy to reduce the deficit. So the difference between the share of investment in GDP in the past and that planned for the future may be larger than the data indicate.

Egypt is not in the situation where investmsnts are lagging relative to similar countries, as its investments are an average or a little above average share of GDP (Table 2). Though the statistics are not exactly comparable, they reveal that the increases proposed in the plan will mean that investments are a high proportion of GDP in Egypt.

In sum, the level of investment in the budget appears optimistic since it anticipates a several percentage point increase relative to GDP. The country will be hard pressed to achieve this level of increase within five years.

In terms of governmental finance there are three sources for acquiring the resources necessary for the plan. These are self finance, borrowed capital, and borrowing from the Central Bank. These items would include sources for central government, local governments, service authorities, economic authorities, and public sector companies. Self finance includes government sale of assets, repayment of prinicipal on debt held by the central government, depreciation accounts, and current account surpluses transferred to the capital accounts[5]. These self financed revenues are available either for investment (bab 3 expenditures) or repayment of principles on debt owed by the central government (bab 4 expenditures).

5. Self financed resources are listed in the bab 3 revenue account.

TABLE 2

GROSS DOMESTIC INVESTMENT AS A
PERCENTAGAE OF GDP, SELECTED COUNTRIES AND GROUPS[1]
(1979)

COUNTRY OR GROUP	PERCENTAGE
Oil Exporters, Middle Income Countries[2]	30
Oil Importers, Middle Income Countries	25
Jordan	48
Morrocco	23
Sudan	14
Egypt[2]	31

Source: The World Bank, World Development Report 1931, August 1981.

1. Gross domestic investment is larger than fixed investment used elsewhere in text. Also, the World Bank data may be different from that reported by the GOE.

2. Egypt is classified as a middle income country.

Resources available for investment are not earmarked for a particular sector, so it is impossible to evaluate the GOE's ability to finance WSD projects. Analysis must be focused on capacity to finance the entire five year plan. Even that is difficult because most of the resources are borrowed rather than self generated. Debt financing is not unreasonable if the GOE can repay the external debt because the returns from the investments accrue overtime.

The budgeted sources of revenues to finance investment accounts for 1981/2 and 1982/3 are shown in Table 3. Self finance is budgeted to provide just over one-fifth of investment resources in each year. Appreciation accounts for public sector companies are the largest self finance source. A budgeted current account surplus, which probably failed to materialize, was the source of much budgeted revenues for 1981/2. Relatively large installment payments and accrued amounts are important in 1982/83.

Domestic and international borrowing are the predominant items financing investment. Most of the domestic borrowing is from government pensions, social insurance, and development loans none of which is acquired through market transactions. The domestic borrowing for 1982/3 represents 10.5 percent of GDP. The concern with domestic borrowing is that it uses up the local currency financing that could be used for private sector activities. International borrowing, called credit facilities, is budgeted for just under one-half the level of domestic borrowing.

The "other" category will be financed with borrowings from the Central Bank, which is comparable to increasing the money supply. Borrowing from the Central Bank allows the government to obtain resources through the creation of inflation.

Self finance offers little potential for significant growth in the future, particuarly since current account deficits are more likely than surpluses. Lack of self finance is not a reason to curtail investment, however as return to the investments is the more important issue, potential for greater borrowing to finance investment is much more difficult to assess. A refined evaluation of the GOE's ability to increase external borrowing is beyond the scope of this paper and only some broad generalizations can be provided.

Several mass distribution magazines have recently reported that Egypt is on the list of borrowers being watched with regards to its level of exteral borrowings. Total external public debt as a percent of GNP was 60.4 percent in 1979 compared with 24.5 percent for middle income, oil exporting countries and 17.4 percent for all middle income countries. Debt service in Egypt was 5.5 percent of GNP in 1979 compared with 5.3 percent for oil exporters and 3.2 percent for all middle income countries.

TABLE 3

FOREIGN EXCHANGE IN THE FIVE YEAR PLAN
(Millions of LE in 1981/82 prices)

Sector	Total Investments	Domestic Currency	Percent	Foreign Components			
				Total	Percent	Free	Facilities
Commodity Sector	17398	9978	57.4	7420	42.6	3772	3648
Production Services	7129	4014	56.3	3125	43.7	1360	1755
Social Services	8090	6124	75.7	1966	24.3	881	1085
(Public Utilities)	(1993)	(1300)	(65.2)	(693)	34.8	(270)	(423)
Public Sector Only	26077	15068	57.8	1,009	42.2	4713	6296
Private Sector Only	8000	6430	80.4	1570	19.6	1355	215
Total Investment	34077	21498	63.1	12579	36.9	6068	6511

1. Some investment is not allocated by sector

Perhaps in response to these relationships, the 1982/83 budget for external borrowing is 27 percent lower than the previous year. As shown below, the plan is for constant price decreases in public sector foreign exchange borrowing, so the share in GDP will obviously fall over time. The low potential for growth in self finance combined with declining foreign credit means the plan is religion on some combination of domestic borrowing and Central Bank loans to finance the plan.

Public sector domestic borrowing can be increased through market activities through increased use of non-market borrowing or through the Central Bank. The issue is whether the return on assets used in the public sector equals the opportunity cost. Public sector use of domestic credit is best if the rate of return on its projects' exceeds the rate of return on private sector projects. In this case public sector activities are best and will lead to the greatest use of potential production. Otherwise, domestic borrowing will croud out better private sector projects and reduce potential production.

In the five year plan, 63.1 percent is to be financed with domestic currency and 36.9 percent with foreign exchange (Table 4). The foreign currency components of the plan would absorb 27.4 percent of expected foreign currency current revenues over the five years. The public sector will use a much higher proportion of foreign exchange in its investment activities. then the private sector. Public utilities will be about average in relative use of foreign exchange. Borrowings in foreign currency are planned to be just over one-half of total foreign exchange needs for investment. The average annual foreign borrowings for the public sector are slightly less than the 1981/82 budget for credit facilities, so foreign borrowings are a declining committment.at least in budgeting terms This reinforces the finding that the five-year plan relies on the use of domestic financing for investment.

The WSD draw on foreign exchange would be LE 1183.2 million with a LE 3400 million plan and the same proportion going to foreign exchange as shown for the public utilities row of Table 4. The local currency costs would be LE 2216.8. An AID committment of LE 830 million ($1 Billion) could cover all but LE 353.2 million in foreign exchange needs Foreign Exchange from other donors is estimated at LE 158.6 leaving the GOE needing to provide LE 194.6 million over the five years. The more significant responsibility is the requirement of an average of LE 443.4 million in annual local currency costs. The 1981-82 investment budget for all WSD institutions except Suez Canal Authority was LE 263.3 million, through the current Five Year Plan including the anticipated 1981-82 expenditures in the public utilities sector of LE 417 million. These values would incluide foreign exchange and local currency costs and as noted above are probably higher than actual 1981-82 expenditures.

TABLE 4

REVENUE SOURCES IN PUBLIC SECTOR OF INVESTMENT
Expenditures, 1982, 1983

Source	1981/1982 (Percent of Investment)	1982/1983 (Percent of Investment)
Self Finance	21.4	21.2
(Depreciation)	(8.7)	(9.1)
(Current Surplus)	(6.9)	(-)
(Other)	(5.8)	(12.1)
Loans and Credit Facilities	70.2	77.5
(Credit Facilities)	(32.5)	(25.0)
(Domestic Loans)	(37.7)	(52.5)
(Other) [2]	8.4	1.3

1. All values are based on budgeted revenues and expenditures. Actual loans and credit facilities and other were undoubtedly greater then is reflected here in 1981/82 as no current surplus resulted.

2. This accounts for those expenditures that are not financed by other two general sources. Borrowing from the Central Bank, which are comparable to financing a deficit through printing money, are the source of this revenue.

OPERATIONS AND MAINTENANCE FINANCING

Bab 1 and Bab 2 expenditures for water and sanitary drainage during FY83 are budgeted to be LE 76,036,500 for the country of Egypt[1]. This is 114.8 percent higher than the comparable statistic for CY77 and is about LE 1.89 per capita (Table 1). Much of Bab 2 is interest and transfer payments which are not O&M expenditures. Adding only wages and the purchase of materials and services, O&M would total LE 53,487,500 in FY83[2], 118.1 percent higher than the 1977 level.

Water and sewerage O&M budgets were tranferred to the governorates beginning with the creation of NOPWASD and are included in the housing directorate of the governorate. Exact amounts involved were not available for our use, but after allowing for growth in housing directorate expenditures it appears that no more than LE 1.9 million from Bab 1 and LE 1.8 million from Bab 2 were transfered for use in all governorates.

The above data is based on budget rather than actual data. Actual data has been requested from each operating organization, but has only been obtained and evaluated in detail for GOGCWS. The GOGCWS pattern was for Bab 1 expenditures to exceed the budget the last two years (1980/81 and 1981/82) as wage increases were granted at the national level during the year. Bab 2 expenditures have been plus or minus three percent, with spending below the budget greater than that above. Within Bab 2 expenditures for raw materials, spare parts, and office supplies have consistently been above the budget while current transfers have been below budget. Total expenditures were within one percent of budget in 1978 and 1979, but over budget in 1980/81 and 1981/82 as a result of wage increases. The detailed data has not been obtained, but based on aggregate statistics AWSA appears to have followed the same pattern. Thus, actual O&M expenditures have probably been higher than what the budget data reveal[3].

1. Beheira and Suez Canal water and O&M budgets of the governorate are excluded.

2. A small amount of current transfers is for rent payments and legitimately should be considered an O&M expenditure.

3. An important point is that wage increases raise the budget but fail to improve service delivery unless the increases are sufficient to permit better employees to be hired and retained. So wage increases can cause misleading views of growth in O&M expenditures. Since wage increases are responsible for much of the growth in O&M since 1977, the increases must be viewed cautiously.

TABLE 1
BAB 1 and BAB 2 EXPENDITURES[1]

CATEGORY	1977	1982/83	PERCENT GROWTH
Bab 1 Wages	12,848,000	33,069,000	157.4
BAb 2 Other Current Expenditures	22,555,440	42,967,500	90.5
Raw Materials	3,195,160	6,815,500	113.3
Oil and Petroleum	1,029,000	1,374,100	33.5
Spare Parts	2,191,000	4,942,900	156.0
Electricity	4,134,280	4,809,600	16.3
Supplies	93,600	242,400	160.0
Services	1,029,000	2,234,000	117.1
Current Transfers[2]	9,514,800	22,413,500	135.6
Appropriated Transfers[3]	1,368,600	135,500	-90.1
Total[4]	35,403,440	76,036,500	114.8

1. Original budgets for each year.

2. Current transfers includes rents, interest, and depreciation with interest being most significant.

3. Appropriated transfers as transfers specified for certain groups or individuals.

4. The total credit account was omitted because it is basically composed of transfers from the companies to the Central Government. These do not represent costs and the LE 21,893,000 budgeted for GOGCWS in 1982/83 is based on a rate increase that has not occured.

The O&M expenditures discussed till now are at financial costs. Subsidies to energy, adequate depreciation accounts and return to the invested capital have all been excluded. It is estimated that economic costs for GOGCWS are LE 98.0 million (assuming a 10 percent return to captial) in FY82/83 compared with budgeted expenditures of LE 25.6 million[4]. As previously noted, budgeted expenditures include some transfers and interest payments that would not be in the higher total. System expansion as described in the five year plan plus increased consumption will raise these ecoromic costs to LE 149.7 million in FY87 at FY82 prices[5].

O&M expenditures are financed with rates, various charges, and a subsidy. Central government subsidies are the largest component of revenues, representing over one-half of the total. The above data reveals, the implicit subsidies through energy, return to capital and depreciation are much greater than the explicit subsidy. Sale of services is the second largest group, with water authorities rather than sewer collecting almost all of the revenues. Note that the sale of services revenue growth has not kept pace with expenditures, meaning it is a declining share. Other revenues is an assortment of connection charges, rents, interest and other sources. Finally, a deficit is carried forward. Though the reason for carrying a deficit forward is not available, it is probably depreciation accounts that are not funded by the subsidy since they are not out of pocket expenditures. These revenues exclude Suez Canal and the receipts of governorates and villages that buy water at 8 millemes and resell at 20 millemes. The governorate revenues are less than LE 7 million, because the FY83 local government budget for all utility revenues is LE 6.9 million.

Again, these data are budgeted values. Actual data for GOGCWS indicate that production revenues were under budget for each of the three years for which data are available. Connection charges and maintenance services were generally above budget. Total revenues from own sources were well below budget in 1978 and 1980/81 but slightly above budget in 1981/82. The subsidy was dramatically above budget for all three years, with the lowest amount being 30 percent over budget. If the Cairo data is indicative of the country as a whole, the subsidies are even greater proportions of revenues than budgets would suggest and own source revenues are equal to or below budget.

4. Similar analysis has been undertaken in the economic analysis sections of the Cairo Wastewater Project Paper Amendment and the Canal Cities Project Paper Amendment.

5. These are lower limits on rates since they are calculated based on projections for existing levels of O&M, which have allowed the syste to move into a stage of disrepair. Use of actual O&M to estimate rates also is difficult because the rates for each system may be based on a differnt level of O&M rather than a consistent level of adequate maintenance.

TABLE 2

CURRENT REVENUES FOR WATER AND SANITARY DRAINAGE[1]

CATEGORY	1977	1981/82[2]	PERCENT GROWTH
Sale of Services	15,990,000	26,306,000	64.5
Other Revenues	2,073,000	5,940,000	186.5
Subsidy	17,252,400	36,042,000	108.9
Deficit[3]		2,744,000	-
	35,315,400[4]	71,032,000	101.1

1. Budget data.
2. FY82 is used because FY83 data includes rate increases that have not been enacted.
3. This is a deficit carried forward.
4. Differs slightly from expenditures because of data inconsistencies.

The rate structure for consmers ranges from 12 millemes in Cairo to 30 millemes in Alexandria (Table 3). These rates are well below the financial prices for production in Cairo. It is estimated that at the financial prices paid by GOGCWS, the rate would need to be 31.6 millemes to cover O&M in 1982/83 at 1981/82 prices[6]. Including depreciation the rate would need to be 52.6 millemes. Finally, to provide for all costs at economic prices the rate would need to be 152.4 millemes. Families of five would pay between LE 2.29 and LE 5.72 per month for water with the rate for all economic costs. Increased consumption plus expansion of the system will require that the rate be increased to 194 millemes (at 1981/82 prices) by 1986/87. Statistics mentioned by people interviewed with regards to Beheira and the Suez Canal indicate that the financial costs in the smaller systems are much higher than in Cairo.

A new rate structure is currently being proposed within NOPWASD. This schedule would have the rate graduated by level of consumption with the lowest level being 35 millemes.

The low rates create efficiency and organizational problems. In terms of efficiency the rates fail to signal the economic value of the service. This leads to overconsupmtion and wastage, requiring larger capacity than necessary to be constructed. The organizational problem is that the WSD agencies have insufficient resources for O&M, depreciation, and capital investment, thereby hampering proper planning and resource allocation within the agency.

At financial prices the current account subsidy to GOGCWS will grow to LE 13.7 million by 1986/87 without a rate increase[7]. This is a 113 percent increase over the 1981/82 budgeted subsidy. The implicit and explicit subsidies together would total LE 133.9 million at that point. Assuming that O&M was doubled to achieve a sufficient level to prevent rapid system deterioration, the explicit subsidy would be LE 45.4 million and the implicit and explicit together would be LE 188.5 million in FY87.

6. This is a rate for water consumed assuming two thirds of produced water is metered and consumed. Also, this rate is based on O&M and not on all Bab 1 and Bab 2 expenditures. The rate to cover Bab 1 and Bab 2 would need to be 39.8 millemes in FY83 (at current prices).

7. The subsidy is in 1981/82 prices. Sale of service revenues and other revenues are assumed to grow at the same pace as water consumption for the calculation. The subsidy is only for O&M.

8. All costs and a 10 percent rate of return as included.

TABLE 3

WATER RATE STRUCTURE[1]

AREA	RATE (millemes)	
NOPWASD served areas[2]	20	consumers
	10	government department
Alexandria[3]	30	
Beheira	20	
Cairo	12	
Suez Canal	18	

1. Generally these are consumer rates. A new rate structure being proposed by a working group in NOPWASD is:

Consumers	1-30 cubic meters per month	35 millemes
	31-50 cubic meters per month	75
	51- above, cubic meters per month	100
Government		75
Commercial		100
Hotels		150
Reconstruction companies		150
Investment companies		200

   Alexandria and Beheira would be excluded from the new structure.

2. Frequently the water is sold to a local authority (the people's council) at 8 millemes and resold at 20 millemes to consumers.

3. Mr. Abarabbia, NOPWASD, indicated that this would rise to 40 millemes next year and fifty the year after.

The capital account subsidy must be added to all of the above to find the total subsidy. the 1986/87 plan for capital expenditures is the lowest of the five years and still is LE 23,910 million in local currency plus LE 13.9 million in (at the official rate) foreign exchange. Valuing the foreign exchange at an own exchange rate of 1.1 leads to a necessary capital subsidy of LE 42.3 million in addition to the subsidies for O&M.

The GOE's ability to finance these transfers for O&M is not a real issue. The explicit subsidies are an insignificant share of the national budget. Increasing the rates is more important for efficiency and organizational reasons and reducing the subsidies should be seen as a longer term side effect.

Our discussions with knowledgeable officials at the national and local level suggest little likelihood of substantial rate reform in the near future. Those reforms being considered (see Table 3) are designed to reduce the central government transfer into the sector. While a desirable goal, the reforms being considered fall far short of achieving other objectives such as signalling resource value and poroviding sufficient revenues to adequately finance water and sewer systems. No understanding of what a proper pricing scheme should include was evidenced by those interviewed. Further, the current incentive structure for water producers fails to encourage rate increases since the operating company will see most new revenues go to reduce the subsidy rather than be available for improving services. AID needs to play a role in educating people involved in the water and sewer sector as to why rate reform is necessary and the factors that should be included in a properly designed economic rate structure.

AID should seek to tie a "maintenence of effort" clause to any rate reform. In this the central government would continue to provide the current subsidy (possibly inflated) while all additional revenues from rates go to improve O&M and cover all costs. Trying to eliminate the subsidy now has the undesirable effect of reducing local incentives to increase rates and also reduces revenues in the sector. Since the government subsidy would likely double in real terms without rate increases (as described for GOGCWS above), the central contribution would be much lower than without rate reform.

D.3 REVENUE GENERATION

In order for the water and wastewater sector to become financially viable, it must generate revenues sufficient to cover certain costs. In the Egyptian context it seems reasonable to cover the following costs through revenues:

A. Water Systems -
- Operation and maintenance
- Routine annual improvements (such as vehicles, short main extenesions, meters, tools, etc.), and
- Debt service on major capital investments.

B. Wastewater Systems -
- Operation and maintenance, and
- Routine annual improvements.

In neither water nor wastewater systems should revenues contribute to a depreciation reserve since capital improvements should be either loan or grant financed at the time they are required rather than financed from a reserve account. It also seems unreasonable to finance Egyptian wastewater systems on a loan basis since even in the U.S. this subsector receives substantial grant financing.

Revenue generation for the sector will originate, for the most part, in the water subsector since billing for wastewater services is normally accomplished through a surchage on water tarrifs. In order to determine the revenue requirements of the sector and hence the tariffs required, it is necessary to project the various cost elements of the sector into the future, along with the volume of water sales on which the tariffs will be charged. Time did not permit preparation of projections for all major Egyptian water and wastewater systems, so the Cairo system has been selected for review as the probable "worst case" situation.

Revenue Requirements:

Based on the cost elements listed above, the revenue requirements for the Cairo water and Wastewater system were as follows for the GOE fiscal year ending June 30, 1982:

- Water (GOGCWS) - LE 27,001,000
- Wastewater (C/GOSD) - LE 19,845,000

However, these costs are substantially understated because the wages paid by the sector organizations are far below the level needed to attract and retain skilled employees. A reasonable estimate is that at least 50% of the GOGCWS production employees should receive a 300% incentive payment over their base pay to bring them up to an adequate level of compensation. Similiarly, in C/GOSD at least 50% of all employees should receive a 300% incentive payment. Using these correction factors and inflating other costs for general price increases and system growth, the revenue requirements from 1983-1987 appear as follows:

Table 1: Projected Cairo Water and Wastewater Revenue Requirements (LE)

	GOGCWS	C/GOSD	TOTAL
1983	46,112,650	28,243,000	74,359,650
1984	54,055,250	31,693,000	85,748,250
1985	64,364,900	35,567,000	99,931,900
1986	75,332,300	39,920,000	115,252,300
1987	85,740,700	44,814,000	130,554,700

Tariff Projections:

In GOE FY 1981/82 the average Cairo water tariff was LE 0.012/m which generated LE 10,542,059 on sales of 850,371,000 M^3. In addition GOGCWS raised LE 3,065,246 in other revenues from various fees, services, and other payments. There were no wastewater tariffs and no data on C/GOSD's non-tariff revenues. Thus it can be assumed that the subsidy cost of the Cairo water and wastewater system in 1982 amounted to at least LE 33 million.

In order to project tariffs which will generate the required level of revenues it is necessary to estimate the volume of water sales on which these revenues will be based. BVI in their recent (3/83) financial review of GOGCWS has made the following water sales projections:

Table 2: Projected GOGCWS Water Sales

1982 (Actual)		850,371,000 M^3
1983	-	917,600,000 M^3
1984	-	965,300,000 M^3
1985	-	1,017,900,000 M^3
1986	-	1,017,800,000 M^3
1987	-	1,124,700,000 M^3

In addition, BVI has projected GOGCWS non-tariff revenues for 1983-1987. For simplicity it will be assumed that C/GOSD will generate no non-tariff revenue over this peiod. By substracting non-tariff revenue from the total revenue requirement, the required tariff revenues can be summarized as follows:

Table 3: Required Tariff Revenues for the Cairo Water and Wastewater Systems

	GOGCWS	C/GOSD	TOTAL
1983	44,232,650	28,243,000	72,475,650
1984	51,895,250	31,693,000	83,588,250
1985	62,199,900	35,567,000	97,766,900
1986	73,162,300	39,920,000	113,082,300
1987	83,560,700	44,814,000	128,374,700

Based on the above projections, the average tariffs required to fully cover the selected costs of water and wastewater services in Cairo can now be projected.

Table 4: Average Tariff Rates[1] Required to Fully Cover Tariff Revenue Projections (L.E/ M^3)

	GOGCWS[2]	C/GOSD	COMBINED TARIFF
1983	0.049	0.031	0.080
1984	0.054	0.033	0.087
1985	0.062	0.035	0.097
1986	0.069	0.038	0.107
1987	0.075	0.040	0.115

Note 1: Tariff rounded up to the nearest milleme.

Note 2: This tariff covers the debt service included in the projections in Table 1. If debt service is not recovered through tariffs, then the following rates would apply: 1983 - LE 0.038/M^3; 1984 - LE 0.041/M^3; 1985 - LE 0.044/M^3; 1986 - LE 0.048/M^3; 1987 - LE 0.053/M^3.

Recommended Tariffs:

Since the current average tariff for water in Cairo (which does not include a wastewater surcharge) amounts to only LE 0.012/M^3, it would be unrealistic to expect the GOE to impose a combined water and wastewater tariff of LE 0.080/M^3 in the coming fiscal year. What can be expected is that the GOE should make reasonable progress toward covering their tariff revenue requirements. A reasonable target would be an average water tariff that covers water tariff revenue requirements by 1987, and an average wastewater tariff that covers 50% of wastewater tariff revenue recuirements by 1987. Full wastewater tariff revenue generation should be targetted for 1992. The recommended minimum tariff level targets are presented below.

Table 5: Recommended Minimum Tariff Rate Targets

	GOGCWS	C/GOSD	COMBINED TARIFF
1983	LE 0.030/M^3	LE 0.000/M^3	LE 0.030/M^3
1984	LE 0.038/M^3	LE 0.004/M^3	LE 0.042/M^3
1985	LE 0.050/M^3	LE 0.009/M^3	LE 0.059/M^3
1986	LE 0.063/M3	LE 0.015/M^3	LE 0.078/M^3
1987	LE 0.075/M^3	LE 0.020/M^3	LE 0.095/M^3

The average tariffs recommendation in Table 5 above should be considered minimum targets. They provide for a relatively gradual increase in tariffs over the next five years and through the use of an "ability to pay" tariff structure (as recommended by BVI) these rates can be allocated among service users in such a way as to minimize the impact of the tariff increases on the poor.

It may not be polictically feasible for the GOE to increase tariffs annually, so initial increases may have to exceed the recommended minimums. However, the sector organizations should not be allowed to let their rates fall below these minimum levels at any time over the next five years.

ANNEX E

MEMORANDUM FROM THE MINISTER OF DEVELOPMENT

E-1

Translation

January 11, 1983

Ministry of Development and State
four Housing and Land Reclamation
Minister's Office

Memorandum

To the Higher Committee for Policies and Financial Affairs Regarding Water Rates.

On May 2, 1982, the Cabinet approved in principle the issue of increasing water tariffs. The Cabinet also directed to the need of undertaking a study about the recommended rates by the Minister of Finance and the GOGCWS high officials. This study should be based on different categories of consumers (i.e., average amount of water consumed per month by each category) to ensure fairness among consumers.

A memorandum has been sent from the Cabinet to the Higher Committee for Policies and Financial Affairs regarding this approval.

The Higher Committee asked on Nov. 24, 1982, for undertaking a study about the current and proposed water tariffs.

The GOGCWS has prepared a study including all the sides of the problems, social and economic, showing the actual cost of producing water, the current tariffs and the annual subsidies by the Government.

The GOGCWS recommended new rates for water.

The Higher Committee proposed that the Minister of Finance would prepare a study for the new tariffs.

The Ministry of Finance recommended that water tariffs would be increased as follows:

1. Potable Water:

   a. Domestic Use:

Up to 30 m^3 per month per family	20 milliemes/m^3
exceeding 30 m^3 up to 50 m^3 per month	60 milliemes/m^3
exceeding 50 m^3 per month	75 milliemes/m^3

   b. Non-domestic use:

Governmental Buildings	60 milliemes/m^3
Shops, Factories and Workshops	80 milliemes/m^3
Restaurants, Hotels and Hospitals	100 milliemes/m^3
Building and Construction Purposes	150 milliemes/m^3
Investment Companies	200 milliemes/m^3
Water delivered to Heliopolis Co. - an average of - (The Company will resell water for consumers with the same rates mentioned above)	50 milliemes/m^3

2. Treated Water for Industrial Use:

Iron and Steel Factories	35 milliemes/m
Other Factories	60 milliemes/m

3. Non-potable Water for Garden Watering — 35 milliemes/m

The Ministry of Housing has reviewed the water tariffs used in local governments, GOGCWS and AWGA and it was clear that:

1. The current water tariffs differ in local governments from that used in Cairo or Alexandria.

2. Water — Tariffs differ from governorate to governorate and even from city to city or from village to village depending upon the distance for which the water is pumped.

3. Free public fountains are spread in all cities and villages.

4. In some cases, the water rates are decreased by the increase of the consumption.

5. All the current tariffs were applied since a long time and no change occurred in these tariffs since that time.

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6. The current tariff is too low compared with the actual cost of water production. The current cost for water production in local governments is 57 milliemes/m^3 while in Cairo is 53.3 milliemes/m^3 and in Alexandria 35.1 milliemes/m^3. These are the costs under the current situation (e.g., improper water services) and not the cost of properly served water.

7. The current low rates in Egypt led to continuous increases in water consumption by wastage.

8. According to the current regulations, there are some agencies which receive water with special rates less than the normal rates.

9. Studies and statistics revealed that water wastage is about 30% of water produced. This wastage is due to lack of adequate maintenance of sanitary fixtures and negligence of individuals and firms to properly consume water. (Wastage in Greater Cairo only is 25%) which amounts to 165 milliemes m^3/year.

   This amount of wasted water represents the production of three treatment plants, construction cost which amounts to LE 150 million in addition to operation and maintenance costs which will exceed LE 1 million per year.

10. The categories of water consumers are as follows:

    Up to $30m^3$/month/family

    The number of these consumers under this category represents 75% of all the water consumers and consume about 25% of the water produced.

    From $30m^3$ to $50m^3$/month: consumers under this category represent 15% of the total consumers and consume about 40% of the water produced.

    More than $50m^3$/month: consumers under this category are about 10% of the water consumers and consume 35% of the water produced.

11. All foreign agencies providing financial assistance for this sector are asking for increasing the water rates and reducing the water wastage. The AWGA raised the rates of non-domestic consumption according to the World Bank request.

According to that, the Minister of Housing recommends the following:

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First: Water rates for Cairo and Alexandria to be raised as follows:

1. Domestic Use:

Up to $30m^3$ per month per family	30 milliemes/m
Exceeding $30m^3$ up to $50m^3$ per month	75 milliemes/m
Exceeding $50m^3$ per month	100 milliemes/m

2. Houses Constructed by the Government:

Number of Rooms	Rate
1	250 milliemes/month
2	350 milliemes/month
3	500 milliemes/month
more than 3	750 milliemes/month

3. Non-domestic Use:

a) Religious buildings	20 milliemes/month
b) Governmental buildings, shops, workshops	100 milliemes/month
c) Hotels & Restaurants	150 milliemes/month
d) Buildings & Construction Purposes	150 milliemes/month
e) Investment Companies	200 milliemes/month

4. Water delivered to distribution agencies (Heliopolis Co.). Cost of production plus 10% overhead.

5. Treated water for industrial use:

Iron and Steel Companies	35 milliemes/m
Other Companies	75 milliemes/m

6. Non-potable Water for Irrigation — 20 milliemes/m

7. Water supply to ships in Alexandria with a minimum of LE 25.0 — LE $1.0/m^3$

Second: Reduction of water wastage by the repair and improvement of the condition of sanitary fixtures in all the governmental buildings. This could be achieved by:

1. Investigating the sanitary fixutres in all the governmental facilities and start repairing them immediately.

2. Raise the quality of sanitary fixtures produced in Egypt.

3. Training laborors for plumbing works.

Third: The water rates for local governments will be recommended later when enough data from these water works are available.

1. We also recommend establishing water companies in the different governorates as in Beheira and Kafr El Sheikh.

2. If for social reasons the government decided to sell water with rates less than the cost of production, the government should pay the difference.

The results of applying the recommended rates:

1. Cairo Water Works:

   GOGCWS's revenues will increase from LE 8.4 million to LE 52.4 million (according to 1980/1981 water produced) with an increase of LE 43.9 million. This will lead to a surplus of LE 21.6 million instead of a deficit of LE 12.4 million.

2. Alexanderia Water Works:

   AWGA will have a surplus of LE 1.63 million instead of a deficit of LE 1.27 million.

It has been considered that the rcommended new rates will not have great impact on the majority of the consumers as those who consume less than $30m^3$/month represent 75% of the consumers. Those consumers will pay 30 milliemes per m^3 instead of 12 milliemes. The total monthly increase would thus be 540 milliemes while the actual cost for producing $1m^3$ is 55 milliemes. The difference of cost will be compensated by the remaining categories.

Sgd:

Minister of Development and State
for Housing and Land Reclamation

Eng. Hassaballah El Kafrawi

Translated by:
DRPS/UAD:N. Saba, March 21, 1983

1.13

ANNEX F

PUBLIC SECTOR LAWS

F.1. The Public Sector Companies Law No. 111 of 1975

I Establishment and Management

I-1 Any juristic personality can establish a public company either individually or in a partnership with others including the private sector after getting the approval of the competent minister.

Shares might be floated on establishment of the company.

Public companies are managed by a Board of Directors constituted of no less than seven (7) members and no more than eleven (11).

I-2 In all cases, the chairman would be appointed by the Prime Minister and the Board should include representatives of the companies' personnel; whose number would amount to half of the Board's members as against an equal number to that of the appointed and selected members serving on the board of a company, which is partly owned by the private sector. The remaining members of the board are appointed by the Prime Minister, who may well appoint two (2) part-time members for their expertise, and who would be paid an honorarium.

I-3 Regarding the semi-public companies (i.e., partly private), representation on the board will be proportional to the amount of possessed capital belonging to each of the private and public stockholders.

II Organizational Authority/Responsibility of the Board of Directors

II-1 Organizational Authority/Responsibility construes some 12 functions, namely:

(i) preparing the overall plan;

(ii) designing the operational plans required for developing production and quality control; utilization of resources in an economic manner and taking measures needed for increasing efficiency and realization of company's goals;

(iii) setting up a policy: ensuring productivity of personnel, achieving efficiency of operations and regulating work;

(iv) providing and developing funds for financing recurrent operations;

(v) replacing and renovating within related reserves and deciding upon expending directions that are compatible with operational plans and stated goals'

(vi) determining the cost base for each activity performed by the company, and setting up relevant performance standards;

(vii) structuring the management layout and the personnel system;

(viii) determining the employment scheme;

(ix) implementing capital investment projects on schedule;

(x) realizing revenue and expenditure estimates as specxified by the planned budget and endeavoring to increase revenues and decrease costs;

(xi) determining rules governing overtime work hours;

(xii) designing a training system for company's personnel including pre-entry service and in-service programs.

III Rights of the Company's General Ascembly

(i) approving the budget, the profit and loss statement and profit distribution plan;

(ii) looking at the Board's report on achieved results;

(iii) sanctioning the proposed plan;

(iv) amending the company's by-laws;

(v) extending or shortening the company's lifetime;

(vi) increasing or decreasing capital; however, a capital increase sould not be effected before covering the initial capital;

(vii) authorizing utilization of reserves for other purposes;

(viii) suggesting liquidation of the company if needed;

(xi) proposing the merging of the company in another company, or partitioning it into more than one company.

F.2. The Public Sector Personnel Law No. 48 of 1978

I Job Classification and Evaluation (Article 8)

An organization structure should be desgned for each company. Also, a job classification and evaluation scheme ought to specify each position, determine its rights and duties, spell out job requirements an delineate paid wage within the following pay scale:

Grade	Total Annual Salary LE	Percentage of Selection for Promotion on Merit	Annual Increment LE
Excellent	2100	-	-
Higher	1500-2040	-	75
General Directors	1320-1920	100%	72
First	960-1680	100%	60
Second	600-1500	50%	48 - then 100 beginning by 876
Third	360-1200	25%	24 - then 36 beginning with 480
Fourth	240-900	20%	18 - then 24 beginning with 360
Fifth	216-720	10	12 - then 18 beginning with 240
Sixth	192-540	-	12 - then 18 beginning with 240

The organization structure and the job classification and evaluation scheme are to be approved by the Board of Directors, who can amend them when needed.

At any rate, there should be firm adherence to the determined percentage of wates and salaries to the cost of production or the sales volume.

The Board of Directors will, also, set the rules and actions pertinent to the implementation of the job classification scheme; in a form congruent with the nature of activities and goals outlined for the company and within the standards decided by the Prime Minister.

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II Recruitment of National and Foreign Experts: (Article 11) - The Board of Directors puts a system for recruiting national and foreign experts, employing short-time specialists, filling seasonal jobs and deploying personnel, in line with both the activities performed by the company and suiting surrounding circumstances, so as to achieve its objectives but within the laws issued by the State in this respect.

III (a) Fringe Benefits, Monetary and In-kind Benefits and Compensations: (Article 39) - The Board of Directors sets the systems regulating fringe benefits and monetary rewards and compensation. (Article 40) While considering the decisions made by the Prime Minister, the Board of Directors may give the following benefits and determine their amounts:

1. A representation benefit to the appointed members of the Board and to those filling higher positions as determined by the Chairman of the Board; within 50% of the representation benefit paid to the latter.

This benefit is exempted from taxation.

2. Risk benefit - at a maximum of 40% of the beginning of the pay scale specified for the position by the concerned employee.

3. Residence benefit to those living in remote places or under life conditions implying such a benefit; which is exempted from taxation.

4. Professional benefit to perform certain jobs which cenies their holders the right to practice their profession privately.

(b) In-kind Benefits: (Article 43) - The Board of Directors collaborates with the companies Trade Union Committee in designing a system for in-king benefits; which might be given to personnel whose jobs necessitate receiving such benefits.

(c) Overtime Compensation: (Article 44) - An employee deserves a compensation for working overtime hours and/or doing exceptional activities upon request of his superior. This is to be effected within the outline framed by the Board of Directors.

(d) Pecuniary and Non-pecuniary Incentives: (Article 48) - The Board of Directors prepares a scheme for pecuniary and non-pecuniary incentives of all kinds, which helps achieving the company's goals and realizes increases in the quantity and quality of production; and to be based on standards measuring performance.

(e) Rewarding Excellence and Innovations: (Article 49) - The Chairman of the Board of Directors may decide to reward excelling laborers and those who rencer outstanding services and/or research ideas and initiatives for improving working procedures or stepping up efficiency and reducing costs.

The Chairman of a company's general assembly may decide to award an incentive equivalent to the amount of an annual salary increment; on condition that:

1. the employee/laborer realized cost savings or leveled up the performance standard, increased production, and if his work was rated at an excellent grade;

2. the number of people receiving such award, over one year, should not exceed 10% of the working force constituting each class of people.

IV Health, Social, Cultural and Sports Scheme: (Article 51) - The Board of Directors collaborate with the Syndicate's Committee in designing a scheme for health, social, cultural and sports for its personnel no less than those mentioned in Law No. 91 of 1959 and its amendments (Law No. 137 of 1981) in areas related to industrial and professional safety and hygiene.

V Determination of Working Days: (Article 53) - The Board of Directors determines the working days and hours over the week. These should comensurate with the company's operational plan, nature of activities performed and predetermined goals.

VI Training and Human Resources Development: (Article 61) - The Board of Directors maps up a training and development plan for its personnel. This plan specifies the programs, procedures and actions required for preparation to hold higher positions as well as the methods for monitoring and evaluating efforts therein.

Missing a training program amounts to violation of work rules.

Financial arrangements for training and human resources development are tuned to regulations compiled by the Board of Directors.

F.3. Labor Law No. 137 of 1981

I Health and Industrial Safety (Article 115)

Each firm should provide the means for health and industrial safety at the work places so as to guard against job risks and hazards especially in connection with:

(a) mechanical risks: (buildings, machines, transportation, collapse of a building);

(b) natural risks: (affecting health, i.e., heat, humidity, cold, electricity, lighting, noise and radiation);

(c) negative risks: (i.e., shortage of first aie and rescue equipment, cleanliness and nutrition facilities);

(d) chemical risks: (i.e., fumes, gases, dust and fire).

II The competent administrative agency (Article 120) is authorized to close down completely or partly the firm which refuses to implement the aforementioned regulations in due time and course or in situations when employees are vulnerable to damaging risks and/or health hazards.

III Periodic Health Examinations: (Article 122)

The firm has to undertake periodic health examinations for all is employees who are susceptible to occupational injuries. The aim is to preserve their physical fitness and to discover early ailments.

These health examinations are managed by the General Organization for Health Security against a fee paid by the firm as described by the Social Security Law.

IV Investigation of Working Conditions: (Article 128)

A committee for health and Industrial Safety ought to be established to investigate working conditions, occupational hazards and ailments, and to specify needed arrangement for their prevention. The firm has to execute decisions made by that Committee Nomination of complying firms; constitution of committees and organization of its working procedures are to be decided by the Minister for Manpower and Training.

ANNEX G

PROPOSED USAID SECTOR ORGANIZATION STRUCTURE

G. Proposed USAID Sector Organization Structure

In order to efficiently operate a sector program of over $1 billion, USAID will have to re - rexamin its own internal organization. Radical restructuring is not necessary, but better coordination and follow-up between various parts of the Mission would be beneficial. The responsibilities and staffing levels of program implementation groups requires re-examination.

Primary responsibility for the sector program is, and should be, centered in the Office of Urban Administration and Development (DRPS/UAD). This office will require functional reorganization and augmented staffing to carry out its sector responsibilities. In addition, the sector program warrants the creation of two ad-hoc sector groups within the Mission to coordinate inter-office involvement in policy and executive decisions.

The proposed organizational structure is presented below:

USAID Sector Policy Group

- Chairman: AD/DRPS
- Members : DRPS/UAD/OD
  DPPE/PAAD/OD
  HRDC/H/OD

USAID Sector Executive Committee

- Chief Executive Officer: DRPS/UAD/OD
- Members: DRPS/UAD/Program Managers
  DPPE/PAAD/Urban Advisor
  HRDC/H/Health Specialist
  LEG/Program Attorney
  CON/FA/Program Financial Analyst

Sector Program Management (DRPS/UAD)

- Office Director
- Engineering Design Manager
- Project Implementation Managers:
  - Cairo
  - Alexandria
  - Canal Cities
  - Secondary Cities
- Management/Technical Assistance and Training Manager

The Sector Policy Group would be responsible for coordinating Mission policy in the water and wastewater sector. It would identify investment priorities, recommend annual obligation levels, monitor sectoral performance in policy reform and project implementation, and conduct the official policy dialogue with the GOE.

The Sector Executive Committee would be responsible for the execution of the Sector Program. It would manage all activities required to: obligate funds for the sector; contract for design, implementation, and technical assistance services; and control expenditures of program funds. Members would meet regularly to coordinate and monitor inter-office activities to prevent internal bottlenecks from hampering program execution.

The Sector Program Management would be located in DRPS/UAD as a branch within that office. It would be responsible for managing the day to day activities required to execute the Sector Program. Managers would be assigned to one of three responsibility areas: engineering design, project implementation (by geographic area), or management/technical assistance and training. These three responsibility areas correspond to the three functional divisions of funding in the proposed Sector Program.

To accomodate this structure DRPS/UAD should be restructured and staffed as follows:

Office Director - AID Direct Hire (DH)
Water and Wastewater Branch Chief - (DH)
- Engineering Design Manager - (DH)
  . Sanitary Engineer - (FSN)
  . Sanitary Engineer - (FSN)

- Project Implementation Managers:
  . Cairo Projects - (DH)
  . Alexandria Projects - (DH)
  . Canal Cities Projects - (DH)
  . Secondary Cities Projects - (DH)

- Project Implementation Staff:
  . Engineers (FSN: 6 positions)

- Management/Technical Assistance and Training Manager (DH)
  . Public Administration Specialist - (FSN)

- Housing and Urban Development Branch Chief - (DH)
  - Social Analyst (FSN)
  - Architect/Engineer (FSN)

- Program Administration Staff:
  - Accountant (FSN)
  - Management Analyst (FSN or U.S. Local Hire)
  - Secretarial Staff (FSN or U.S. Local Hire: 4 positions)

This structure would require nine AID Direct Hire Officers and seventeen Foreign Services National and U.S. Local Hire Staff compared to DRPS/UAD's current compliment of seven Direct Hire Officers and twelve FSN and U.S. Local Hire Staff.

ANNEX H

FUNDING/EXPENDITURE CYCLE ANALYSIS

H. FUNDING/EXPENDITURE CYCLE ANALYSIS

STEPS REQUIRED UNDER STANDARD AID PROJECT MODE TO GENERATE DISBURSEMENT:

1. PROJECT FUNDS OBLIGATED
   - 1.A. USAID & AID/W approve PP.
   - 1.B. Congressional Notification period lapses.
   - 1.C. USAID&GOE sign a Project Agreement.

2. PROJECT FUNDS AVAILABLE FOR EXPENDITURE
   - 2.A. Implementation Letter No. 1 issued by USAID.
   - 2.B. GOE satisfied all Condition Precedent (CP's) to disbursement.
   - 2.C. USAID certifies that all CP's have been met.

3. PROJECT FUNDS SUBOBLIGATED FOR EXPENDITURE
   - 3.A. GOE defines need for funds.
   - 3.B. USAID agrees to need as appropriate for project.
   - 3.C. GOE develops contract form, tender documents, and cost estimate.
   - 3.D. USAID approves contract form, tender doc's, and reasonableness of price per HB 11.
   - 3.E. GOE advertises tender locally.
   - 3.F. AID/W advertises tender in U.S. on USAID advice.
   - 3.G. Tenders submitted to GOE.
   - 3.H. GOE analyzes tenders and recommends contract award.
   - 3.I. USAID reviews award and approves or disapproves (disapproval usually forces a re-bid).
   - 3.J. GOE signs contract and sends copy to USAID.
   - 3.K. USAID - AID/W opens an L/Comm (either "Direct" or "Bank") and advises GOE.
   - 3.L. (If Bank L/Comm is used, GOE opens L/C against L/Comm).

4. PROJECT FUNDS EXPENDED
   - 4.A. Contractor delivers goods/services as specified.
   - 4.B. Contractor submits invoice/payment documents.
   - 4.C. GOE approves payment and notifies USAID.
   - 4.D. (If AID Direct L/Comm is used, USAID reviews and approves payment also)
   - 4.E. U.S. bank executes payment (if L/C is used) and reports to AID/W for reimbursement.

POINTS AT WHICH DELAYS OCCUR:

Although it may take over a year from the time a project is first identified until funds are obligated, this is all preliminary to the Funding/Expenditure cycle and will not be analyzed here. (Obligating funds for the GOE each year has not yet proved to be a bottleneck).

A. POINTS 2.B/2.C: All Conditions Precedent Satisfied

In most cases it takes over a year for the GOE to satisfy all CP's to disbursement. In water and wastewater projects there have been the following delays:

1) Cairo Water (Project 263-K-042/263-0038)

Loan Agreement signed	: September 29, 1977
All CP's satisfied	: March 8, 1979
Elapsed time	: One year and six months
Grant Agreement Signed:	September 22, 1981
All CP's satisfied	: January 25, 1982
Elapsed time	: Four months

2) Cairo Sewerage (Project 263-0091)

Grant Agreement signed:	September 30, 1978
All CP's satisfied	: February 22, 1981
Elapsed time	: Two years and five months
Grant Agreement Signed:	September 27, 1981
All CP's satisfied	: June 2, 1982
Elapsed time	: Eight months

3) Alexandria Wastewater I (Project 263-K-044)

Loan Agreement signed:	September 29, 1977
All CP's satisfied	: March 30, 1980
Elapsed time	: Two years and six months

4) Alexandria Wastewater II (Project 263-K-044)

Grant Agreement signed:	August 29, 1977
All CP's satisfied	: January 6, 1981
Elapsed time	: One year and four months

5) Canal Cities Water/Sewerage (Project 263-K-050/-0048)

Project Agreement signed	: September 30, 1978
All CP's satisfied	: February 26, 1981
Elapsed time	: Two years and five months

These delays have generally arisen because of problems in contracting for U.S. engineering services, and certifying the availability of local currency budgets for the projects.

B. Points 3.A/3.B: Need for Funds Defined

Delays occur at this point in water and wastewater projects due to the leadtime required to prepare engineering designs, specifications and cost estimates. Without these pieces of technical information neither the GOE nor AID can know exactly how their funds are to be spent. Designing a major water or wastewater project requires from one to one and a half years under the best of circumstances. Lengthy GOE design reviews and major changes in design parameters add to the delay.

C. Points 3.C./3.D: Contract Forms and Tender Documents

Delays occur at this point because of the special AID requirements concerning the form and content of contracts financed by AID. HB 11 specifies required contract provisions and formats for tender documents. Both the GOE and their U.S. engineers are not generally familiar with HB 11 requirements. As a result, delays occur when USAID is forced to review and revise documents prior to tendering. In some cases months can be lost before a final tender package is approved for release to bidders.

D. Points 3.H/3.I: Award of Contracts

GOE and AID tendering procedures differ substantially and this can cause delays if GOE procurement committees violate AID's procurement rules during the bidding process. Delays can also occur if GOE procurement committees require higher level approvals that take weeks or even months to obtain. Even after the GOE recommends an award, USAID must satisfy itself that the final proposed contract is reasonably priced, in a form acceptable to AID under HB 11, and did not result from any

unfair or unacceptable procurement practices on the part of the GOE. Formal USAID approval of a contract can take a month or more after the GOE submits its request. Failure to obtain USAID approval of a contract often leads to lengthy re-bids consuming from six to twelve months of project time.

E. Points 3.K./3.L: Opening L/Comms and L/C's

Although arranging financing documents should be a routine procedure, AID's use of L/Comms often leads to delays. In some cases AID/W takes weeks to open an L/Comm after USAID's request. Once the L/Comm is open, the GOE's banks often do not request L/C's expeditiously or do not prepare L/C's that conform to the provisions of the L/Comms. Arranaging proper financing documents can require any where from one to six months.

F. Points 4.C/4.D: Approval of Payments

Delay occur at this point due to lengthy review of payment documents by the GOE and USAID. Where bank L/Comms' and L/C's are used this delay is minimized since the contractor submits his documents directly to the bank without prior GOE or USAID approval. Even then, final (10%) payments have been delayed for lack of GOE Acceptance Certificates. AID Direct L/Comm's require the GOE and AID to undertake detailed voucher processing before executing payment. The GOE voucher review can take one to two months depending on the efficiency of their accounting unit. The USAID voucher review requires an additionl two to three weeks.

The six delay points in the funding/expenditure cycle can easilly lead to a situation where substantial expenditure of project funds is delayed for up to three or four years after the initial funding obligation. It is not uncomman for projects to wait a year before the first, small expenditures are recorded.

III. METHODS OF REDUCING DELAYS:

In general, the standard AID project mode calls for numerous USAID and GOE interventions in the funding/expenditure cycle. Each intervention creates a potential source of delay and project histories indicate that those sources are living up to their potential. Bureaucratic organizations are not well adapted to taking rapid decisions and implementing actions with

a minimum of procedural activity because this implies risk taking, individual initiative, and a "product" (rather than "process") orientation. Thus the basis for reducing delays in the funding/expenditure cycle is to reduce the number of USAID and GOE interventions in that cycle.

In some cases, interventions can not be eliminated. To limit delays, such interventions should be:

1. made less complicated,
2. assigned to an individual with authority and responsibility to manage the intervention process, and
3. undertaken, earlier and in parallel with other project activities rather than sequentially.

Using these guidelines, each source of delay in the funding/expenditure cycle can be examined for elimination or streamlining.

Satisfaction of Conditions Precedent (CP's) to disbursement is a necessary intervention by the GOE in the funding/expenditure cycle. To reduce delay AID should ensure that CP's are limited to those essential to successful project implementation. In so far as possible, CP's should be identified at the PID stage so that the GOE can begin preparing the necessary documentation in advance of signing the Project Agreement (PROAG). In the case of CP's requiring a U.S. engineering services contract, the Request for proposals (RFP) package should be agreed with the GOE and advertised (if possible) even before the PROAG is signed. This would allow RFP packages to be released to interested firms as soon as the PROAG is signed.

The GOE and USAID should each designate one individual in their organizations who will be responsible for following-up all actions needed to satisfy CP's. For USAID this should be the Project Officer and he should be required to prepare a monthly status report on all CP's indicating the status of action on the CP's, reasons for any delays, and actions taken to expedite their satisfaction. This report should be submitted to the relevant Assistant Director each month until all CP's are satisfied.

Defining the need for project funds is necessarilly a time consuming activity in major capital projects such as water and wastewater systems. At a minimum, functional designs and cost estimates are required before the specific uses of project funds can be defined. Developing these designs and estimates takes from 9 to 12 months for major systems under the best of circumstances. Design time can be reduced to some degree by increasing the number of engineers at work at any given time but this will increase the cost of the design work. For any given project, there will be an irreducable minimum design period. As one approaches that minimum the cost of design work escalates sharply. On the other hand, frequent and lengthy "design review" periods extend the design period and add to design costs by creating unproductive "down-time" for the engineers.

The simplest method of reducing design delays is to take the design function out of the project funding/expenditure cycle altogether. This could be done by regognizing functional deisgn work as a pre-project activity and establishing separate, i.e. non-project, funding for this work. Under this approach functional designs would be completed and approved before the PP is prepared. Thus funds obligated under a PROAG would be only those required to construct the systems.

Delays caused by preparation of tender documents, award of contracts, opening L/Comm's and L/C's, and approval of payments could be dramatically reduced through the use of "turnkey" contractors. The tendering for each project would be reduced to one overall contract to execute detail designs, procurement, civil work and errection on a fixed price basis within a specified time. Repeated contracting actions would no longer the responsibility of USAID and the GOE thereby eliminating their involvement in those process and reducing the potential for delays.

CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing analysis, a project implementation system can be devised to reduce the USAID and GOE internentions in the funding/expenditure cycle. Such a system will reduce the delays which arise between the time when project funds are obligated and the time when they are expended.

The system involves the establishment of a Water and Wastewater Sector Program to fund all activities related to the development of the sector. The Sector Program would include funds for three purposes.

1. Project Design from masterplanning through complete functional designs suitable for tendering turnkey construction contracts.

2. Project Implementation (turnkey) from detail design through procurement, civil works, errection, test and turnover of completed systems.

3. Project Support for technical and management assistance to sector organizations.

The third catagory will not be discussed in detail in this system description since the amounts involved will be small relative to the other catagories.

Funds would be obligated for Project Design based on the estimated design cost only and not the cost of project implementation.

All funds for water and wastewater system design work would be grouped under a single PROAG for sector design services. CP's to disbursement under this PROAG would be limited to provision of signatures of authorized GOE representatives, a GOE legal opinion, and design contracts with U.S. firms. Contracting with U.S. firms would be initiated ahead of obligation of funds so that contracts could be concluded as soon as possible after the PROAG is signed or amended. Design contractors would be charged with preparing only functional designs and tender documents suitable for turnkey contracting.

Once the functional designs and cost estimates are complete for a given project, funds would be obligated for Project Implementation. The CP's to disbursement under such PROAG's would include turnkey construction contracts, and U.S. engineering/construction supervision contracts (most probably to be concluded with the U.S. design contrctor). Contracting for the supervision could start even before project implementation funds are obligated, and turnkey contractors could be prequalified as well.

Once the turnkey and supervision contracts are in place, disbursement would commence according to the contract payment provisions. The turnkey contractor would be responsible for preparing detail desings, executing procurements, construction and errection services, and turning over a completed system within a specified time. The supervisory contractor would oversee these activities, approve all design on behalf of the GOE, and approve all payments to the turnkey contractor on behalf of USAID and the GOE (who would execute approved payments subject to post-audit). Under this system USAID and GOE would have to tender, award, and administer only two contracts for each project, i.e. a turnkey contract and a supervision contract. They would not be involved in multipul procurement and construction errection contracts as is presently the case. Obligation of Project Implementation funds would be moved closes to the time when they will be expended and hence the delay in expending these funds would be dramatically reduced.

ANNEX I

PROPOSED USAID-GOE JOINT SECTOR ORGANIZATION STRUCTURE

I. Proposed USAID-GOE Joint Sector Organization Structure

In order to manage a USAID-GOE investment program of the magnitude planned for the Egyptian water and wastewater sector, a joint sector management structure is a necessity. The management structure must be designed to deal with two major aspects of the program:

1. policy issues such as financial reform, institutional development, and sectoral investment commitments;

2. implementation issues such as allocation/re-allocation of funds between projects, resolution of project delays, and monitorying of sector performance.

The objective of the management structure should be to provide a forum for the GOE and USAID to exchange views and reach mutually satisfactory decisions conerning the Sector Program. In essence, the management structure should provide a formal organizational framework for the on-going USAID-GOE sector dialogue.

A. The Need for Joint Sector Organizations:

In the past, USAID and the GOE have managed the sector investments on a project-by-project basis through an informal system of contracts between the UAD Office and GOE sector organizations at the project lelve; and between the USAID Mission Director (and Associate Director - DRPS) and the Ministers of Development and Investment at the policy level. These arrangements operated on an ad-hoc basis. They did not foster continuity of discussion or follow-up of sector wide issues from the GOE side.

In December 1982, at the request of the Minister of Development, USAID and the GOE formed a Joint Sector Working Group composed of the Senior Under-Secretary of the Ministry of Development and the Associate Director for DRPS. The Working Group was made responsible for seeking means of expediting the implementation of water and wastewater projects. This was a positive move, as far as it went. However, the Sector Working Group does not have the authority to deal with policy issues. Nor does it include representatives from the Governorates affected by the program. Since resolving policy issues and obtaining Governorate cooperation will be central to successful implementation of the expanded water and wastewater Sector Program, a formal organizational structure that can address these concerns on a sector basis is needed.

3. Proposed Joint Sector Organizations:

The proposed organization structure is composed of two groups:

1. a high level "Joint Sector Steering Group," and
2. a working level "Joint Sector Executive Committee".

These two groups will be responsible for addressing sector-wide issues at the policy and implementation levels respectively.

The USAID-GOE Joint Sector Steering Group:

The Steering Group should act as a kind of Board of Directors for the Sector Program. It should be composed of ministerial level representatives from the GOE including, but not limited to, the Minister of Development, the Minister of Investment and International Cooperation, and the the Governors from Governorates participating in the Sector Program. On the USAID side representatives would include the Director and Associate Director for DRPS.

The Steering Group should be responsible for:

- Monitoring the development of the water and wastewater sector in terms of project implementation, financial viability, and institutional development,

- Agreeing on specific performance targets for sector revenue generation and institutional development for the coming fiscal year, and each subsequent fiscal year for next five years ahead,

- Specifying the allocation of Sector Program monies among the three Program Funds and among the sector organizations participating in the Program.

The Steering Group should became the focal point for the USAID-GOE policy dialogue concerning water and wastewater. It should also play a key role in scheduling USAID obligations for the Sector Program based on the immediate needs of the sector for incremental funding.

The USAID-GOE Joint Sector Executive Committee:

The Executive Committee should act as the senior management of the Sector Program. It should have permanent members including the Senior Under-Secretaries of the Ministry of Development as well as the USAID Office Director for UAD and his water-wastewater Branch Chief. The Executive Committee should also have ad hoc members including: the Chairmen of NOPWASD, A/GOSD, AWGA, C/GOSD, CWO, GOGCWS, the SCA's Director of Engineering and the Secretary Generals from all Sector Program Governorates. Ad hoc members would participate only in those meetings dealing with projects under their jurisdiction.

The Executive Committee should be responsible for:

- Identifying and resolving all problems delaying sector project implementation which are not being resolved by the respective sector organizations,

- Commissioning and approving an "Annual Sector Review" (to be forwarded to the Sector Steering Group) which evaluates all aspects of sector performance and sector needs,

- Proposing changes in the allocation of monies in the Sector Program among the various Program Funds and project organizations for approval by the Sector Steering Group.

With these responsibilities, the Executive Committee should become the primary vehicle for overseeing and expediting sector development. Through its permanent and ad hoc members it would have the capability of dealing with most, if not all, of the potential delays that could hamper the Sector Program.

C. Advantages of the Proposed Organization Structure:

The proposed structure would provide a formal organizational framework for the GOE and USAID to conduct both the policy and the project implementation dialogue. it would create a formal mechanism for following-up sector performance and scheduling USAID obligations. With such a structure the ground rules for USAID sector assistance could be made clear and misunderstandings avoided. It would also create a framework for managing an enormous sector investment program in which AID and GOE have substantial funding commitments.

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ANNEX J

LITERATURE REVIEW

LITERATURE REVIEW

When the development programs in Egypt gained momentum in the late seventies, USAID and other donor agencies became concerned with the capacity of the Egyptian government to absorb the massive amounts of investments being made in various sectors and the ability to manage them.

As a result of this concern various studies were commissioned on a sectoral basis to examine the constraints and obstacles involved and to make recommendations to alleviate these. A correllary interest in general management and institution building also produced studies on management development and training needs in Egypt. These studies represent a wealth of accumulated information and can aid in future planning if effectively utilized. One of the purposes of this review is to call attention to these various resources already in existance in the anticipation they will be utilized more in the future.

This literature review focused on some twelve of these prior studies concentrating on those concerned with the water/wastewater sector as well as representative documents on management and training for the purpose of finding a consensus or pattern of approach to overcome the obstacles impeding this sector. The summary matrix (-) illustrates both the identified constraints in 3 areas: organization; finance; personnel; and the overall consensus of approach to these. With few exceptions all documents identified the same identical problems and recommended the same broad solutions: reorganization at national and regional level; (with retention of revenue at this level); progressive tariffs and user charges; training programs and incentives with long term wage reform. (These recommendations are reflected in the individual matrixes).

These topics are addressed in detail in the body of the assessment. Of interest, however, may be the following comments on training, progress in the sector to date, new Mission activities, UAD's role, and a public education program which supplement the assessment discussions.

Training

One of the most important issues facing Egypt in the water/wastewater sector is the issue of training new personnel or retraining of redundant personnel. USAID/Cairo has been involved for many years in various training programs with varying success. Should a large future sectoral commitment to training be made, a knowledge of some past experiences in training is essential in order to avoid duplicating past mistakes and to design effective programs in the Egyptian environment. (USAID/Cairo's Training Office is now involved in a series of evaluations of past programs). For this reason the Literature Review includes The Middle Management Education Program; the DAI Pilot Activity in Management and Decentralization; and a drafted Mission project paper Decentralization Planning and Management which proposes a national training center and local training centers in the governorates. All of these are programs USAID sponsored in the past.

In the interest of adapting future programs to the Egyptian setting the following case is pertinent. The Middle Management Education Program (1978-1980) was cited in Cases in Management by Dr. Salah El Sayed of American University in Cairo. Far from rating it successful, Dr. El Sayed indicated that the Egyptian management people involved (The National Institute for Management Science) withdrew. The entire program was redesigned for only U.S. involvement and about 100 Egyptians were trained in the U.S. A follow up in 1981 showed they had gained some significant skills and had introduced these in their businesses.

However, due to the fact that the Egyptians did withdraw, USAID sponsored an evaluation in 1980 by Coopers and Lybrand which detailed some of the design problems and assumptions underlying the project which led to its rejection by the very management institution USAID was trying to involve. Coopers and Lybrand subsequently did an assessment of management training needs in Egypt.

Based on this assessment, USAID/Cairo recently has developed a new training project in the Science and Technology Office called Management Development in Productivity. It is concentrating on the private sector and is using an Egyptian management institution, the Sadat Academy of Management Sciences as well as the American Management Association. While too early to tell results the program is worth watching because it does incorporate certain lessons learned from past experience.

AID also conducted a training program through the Office of Local Administration and Development (LAD) in three governorates in 1981 which developed workshop styles and training techniques believed pertinent to the Egyptian environment. Voluminous reports were produced on each workshop and its results. The Development Planning and Management Project Paper was based on these pilot activities. This paper also compiled a comprehensive list of Egyptian universities, consultants, businesses and institutions which are potential resources for training at all levels. For the time being this paper has been suspended since it offered too much technical assistance in Mission's opinion. Given the training requirements for the sector to accommodate the demands, the Mission should realize that substantial amounts of technical assistance are going to be needed. It may be advisable that another look be taken as the DPM paper for its content and resources.

Progress

The studies reviewed began in 1976. Although all or even most of the recommendations have not been introduced it is worthwhile at this point of the new assessment to identify the steps which have been taken over the last six years since they do indicate an effort on the part of the GOE to make constructive changes. The major steps taken based upon the recommendations may be summarized as follows:

1) A/GOSD was formed in Alexandria (1979)
2) AWGA was formed in Alexandria (1979)
3) GOPW/GOSSD were combined into NOPWASD (1981)
4) A pilot water company has been formed in Beheira (1981)
5) Discussions on water rates, sewerage charges, incentives are taking place within the organizations and the People's Assembly. (1982/1983)

New Activities

The studies point out that the GOE needs more coordination among sectors as well as within. This same recommendation can be applied to the Mission. There is a need to keep up with projects throughout the Mission which could complement the water/wastewater sectoral needs. The following new activities within the Mission may do just that. The Office of Science and Technology has a study called: Compensation Practices - Public Sector which is seeking information on bonuses, incentives, fringes, and basic wage scale practices in Egypt to see how this affects USAID programs and the GOE and what efforts could be taken to develop new compensation strategies. Low wages have been cited in each study as a major constraint to the water/wastewater sector. This study could be beneficial in overcoming that constraint.

The Program Office is sponsoring two activities of interest.

1. Workforce Policies and Programs
   The Government of Egypt has asked the Ministry of Investment and International Cooperation to help identify manpower/training needs for various GOE agencies and ministries. This study could also focus, if necessary, on the water/wastewater sector to anticipate such needs.

2. Accelerating Contractor and GOE Project Implementation by Applying the Lessons of Experience
   This activity is designed to help the GOE, USAID, and Consultants develop an "institutional memory" by pooling knowledge of the lessons learned in Egyptian development for more effective programs.

Office of Urban Administration and Development

The assessment recommends that the Office of UAD have implementation authority for the new investments since all water/wastewater projects are concentrated here. Should this come about, the development of an institutional memory within UAD itself would be in order. For several years various consultants in the water/wastewater area have, as part of their contracts, developed basic documents which should be part of a common information bank for reference and to avoid future duplication. These include studies, maps, operations manuals, and reports on various aspects of utility operations and management.

In addition, the Development Information System within Mission can, on request, print out computer listings of studies and projects within Egypt and elsewhere which may have pertinent information and experiences to be adapted to assist UAD's effectiveness and efficiency.

Public Education

Throughout the interviews conducted by the assessment team and the studies, reference was made to the difficulties in raising tariffs. Two particular reasons were cited often: 1)no one will pay for the poor service as it exists now, 2) political instability on the part of the middle class would ensure. (The poorer classes, of course, have demonstrated willingness to pay much more than necessary to get services.)

Although a public education program is not the entire solution to these issues, it can be an effective means to convey accurate information about the real problems of utility service: operations and maintenance; water leakage/conservation; low funds; low tariffs and could complement the on going dialogues. To address the first issue, the program could and should emphasize that user rates raised now could actually be used to improve service quite soon. A stipulation could be made that further raises would be geared to further service improvements. For the second issue, emphasis needs to be made that by spreading out the cost over all the population, actual increases would be less than any class would take on by itself.

Public education could also take the form of advertisement on the construction itself. This has been proposed for Alexandria Wastewater and will be implemented shortly. This includes signs in Arabic and English at the construction sites of several sewer projects which will say "Sorry for this inconvenience, but in Smouha (for example) sewer service will be expanded soon. This is possible through funds provided by AGOSD and USAID."

This Literature Review calls attention to resources available which can assist the Mission and the Office of Urban Administration and Development carry out the current and future investment program.

A public education program should commence as soon as possible to illustrate the issues involved in the sector: o/m, quality, low funds, low rates and push towards incorporating an initial tariff raise before quality improves. The program should emphasize "your funds <u>now</u> will help you get the service you want later." The public may as well find out the connection between their low rates and their poor service.

Finally, a public education program should also illustrate means for water conservation in the home and the neighborhood.

SECTOR

Constraints/Obstacles	Summary Recommendations	Already In Place in GOE
1) Inadequate Organizational Framework:	a) Reorganize Sector along lines of:	
a) Fragmented authority	1) Ministry of State for Utilities-(report to Cabinet)--	MOH/Kafrawi
b Lack of delegation	2) National Public Utility Rate Board----(policy body)	
c) Management Shortcomings	3) National or High Commission--(policy guidance and implementation) --	NOPWASD
d) Coordination poor within sector; with other sectors.	4) At regional level: Public Water Company's --	Beheira
e) Insufficient policy guidance.	b) Coordinate sector through these bodies.	
f) Inadequate enforcement of some laws and regulations.	c) Members of these would represent other sectors, too.	
g) Inadequate systems, like internal planning, budgeting, inventory.	d) Uniform tariff and policy guidelines.	
	e) Internal problems need specific technical assistance per organization	
2) Financial Shortcomings		
a) Low investment on part of GOE	a) Incorporate organizational framework described above.	
b) Inadequate funds for utilities due to inability retain revenue.	b) Committment of funds from GOE to sector.	
	c) Gradually introduce user fees - on water with perhaps % for sewerage costs. Phase in i.e. Beheira to cover o/m, then debt depreciation.	
c) Low tariffs		
d) Low/little cost recovery.	d) Amend statutes or change structure of agencies to Public Water Companies at the regional level and allow retention of revenue.	
e) Inadequate operations and maintenance.		
3) Personnel Policies		
a) Inability to retain and attract skilled staff.	a)Substantial investment in training by sector. Retraining for redundant personnel.	
b) Masked unemployment (redundant personnel).	b)Preparation/commitment to training in various forms: 1)action oriented workshops involving all levels of management 2)on the job training. 3)training cycles(diagnosis, training, application, repeat). (Management Development in Productivity has incorporated this style). 4)overseas training. 5)capacity building within organizations.	
c) Inadequate personnel policies: low wages; low benefits; use of incentives as punishment; no promotion on merit.	c) Make manpower/sectoral projections for future needs and coordinate with schools, business, utilities. (See DPM project paper Annex P).	
d) Inadequate construction monitoring due to personnel shortages.	d) Provide Technical assistance within individual organizations.	
e) Functional perspective.	e) Payment/structuring of financial incentives; awards based on performance; promotion by merit. Long range goal: adjustment of basic wage scale.	
	f) Standards of performance for top management as well as rank and file.	

1977: WHO/HB WATER SUPPLY AND SEWERAGE SECTOR STUDY

Obstacles/Constraints	Recommendations from Report	
1) Inadequate institutional framework	a)Strengthen local management but retain central coordination.	b)Rearrange sector responsibilities; strengthen regional structures for GOPW/GOSSD. Provide Central Coordination of sector.
2) Severe shortage skilled staff.	a)Employment policies to attract and retain skilled staff(salaries, fringe benefits, promotion).	b)Training programs to provide adequate manpower sector wide.
3) Shortage of funds (GOE) Revenue.	a)GOE Commitment. b)Progressive tariffs - (user rates) Tariffs based on full cost recovery but,with concessionary rates for poor.	
4) No conservation of water.	A Priority Recommendation.	
5) No incentive for financial management	a) GOE Commitment b) Progressive tariff	
6) No continuing in materials supplies	a) Recommend study to investigate means to supply adequate amounts.	Improve local industries particularly: asbestos cement; cast iron pipes; electrical and mechanical equipments.
7) Insufficient training facilities.	Same as # 2	
8) Inadequate management/inspection.	Same as # 1 and 2	
9) Little public education for use and conservation.	Begin public education programs	

Priority Recommendations of Report

1) Reduce leakage
2) Ensure adequate production, distribution; and storage capacity.
3) Extend public water supply to urban dwellers.
4) Upgrade existing urban facilities.
5) Renew low cost, rural sanitation programs.

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1978: MANAGEMENT-TARIFF STUDIES RELATIVE TO WATER AND SEWERAGE SYSTEMS

Sector Constraints	Major Recommendations
1) Fragmented Authority and Management Shortcomings	1)Grant operating agencies authority by a) Amending current statutes b) Developing new statutes
2) Unable to attract retain key personnel due to wages, benefits.	c) Create Public Companies at regional level
3) No financial autonomy Inadequate rates Low O&M	2)Establish financial autonomy by a) Establishing National Public Utility Rate Board.
4) Fewer resources allocated to sewers than to water	b) Revise user rates; give more- operational and maintenance c) Strengthen coordination via a High Commission for Policy Guidance.
5) Coordination at Nat'l/local levels poor.	d) Enforce current utility laws 3)Patterns of organizational framework.
6) Due to personnel shortage, construction monitoring down.	a) Establish Greater Alexandria. Metropolitan Area Water Organization b) General Organizations or Public Companies should be established in Alex/Cairo-for sewerage.
7) Insufficient policy guidance at national level	c)AWGA should be responsible for all planning, construction operating service in Alexandria.
8) Research neglected in various areas	d)In the other 6 regions independent, combined W/WW organizations or public companies should be made.
9) Laws/registrations not enforced i.e. sewer use laws	e)In the Suez Canal region combined W/WW public companies owned by SCA should be created or two separate organizations in water and wastewater created.
	f)GOPW/GOSSD should be combined. (Done 1981)

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1980: MIDDLE MANAGEMENT EDUCATION PROGRAM
1980: EVALUATION BY COOPERS AND LYBRAND

Problems in Management

1) Government influence public sector still influences

2) Top Management reluctant to accept change and to be involved.

3) Lack of Commitment organization participation in training programs.

4) Organizational response to change often reluctant or non-reluctant

Discourages trainees who attempt to implement change

5) Lack of delegation of authority

6) Lack of incentives and motivational schemes.

Major Findings about Egyptian Response to Training

Most effective training techniques
(1) Case Studies training

(2) Management simulation games

(3) Participatory classroom techniques which are applied to specific problems in GOE organizations.

4) Placement of trainees in U.S. in organizations which correspond to those in which they work in Egypt.

5)Need structured programs and specific performance measures in workshops or internships.

1980: ASSESSMENT OF MANAGEMENT TRAINING NEEDS IN THE A.R.E.
COOPERS AND LYBRAND

CONDITIONS IN EGYPT WITH CREATE OBSTACLES

1) Centralized authority and structural social roles. Decisions made at very top and dependent relationships are among employees enhanced.

2) Performance measures are secondary to political and social success.

3) Communication patterns flow downward to create reactive environment to change.

4) Motivation/ incentives not related to performance but to political or social power.

Effective Training Programs

Must be measured in teams of contribution to organizations effectiveness not just individual styles.

Not aim solely at individual-but, at capacity building with the culture. Matrix of environmental and organizational conditions in Egypt included.

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1980: PROVINCIAL WATER SUPPLIES PROJECT
WORLD BANK

Constraints on the Sector	Recommendations	
1) Fragmented responsibility 2) Lack of coordination in planning and operations and with other sectors. 3) Lack of effective use of resources.	Bring all public schemes within single institutional and organizational framework.	
4) Lack of responsiveness to needs and poor service	Provide substantial measures to decentralize planning and day-to-day operations.	Establish semi-autonymous provincial water undertakings and delegate authority and revenues to that level.
5) Lack of accountability 6) Lack of delegation of authority	Provide Institutional changes and new management systems to reflect performance-oriented approach to water supply.	
7) Poor motivation and staff performance		

Institutional Framework proposed	Central Gov't will control:
a)Minister b)High Council of Utilities policy making body. c)National Water Authority to supervise execution of policies proposed by "b". d)Local public Water Companies at governorate level.	a)Investment policies and financing investment. b)Setting pricing policy. c)Setting minimum standards d)Setting inspection procedures e)Setting nat'l guidelines over pay and personnel.

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1981: DIAGNOSTIC REVIEW OF ALEXANDRIA GENERAL ORGANIZATION FOR SANITARY DRAINAGE
TECHNICAL AFFAIRS AND O/M
BOYLE ENGINEERING CORPORATION

Internal Organization Problems

1) Central planning department does not exist divided between managements.

2) Engineering Department difficient in space, variety of desciplines, equipment.

3) Standard, policies non-existant for construction measurements/no uniform change orders.

4) Planning, design, and construction management does not exist.

5) Central organization for Operational and maintenance not exist.

6) Operational and maintenance has severe problems: no manuals, no training program; no inventory no previous maintenance program no operating records no safety programs no equipment maintenance facilities.

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1981: MANAGEMENT DIAGNOSTIC REVIEW OF AGOSD

1) Lack of Management Systems-"how to"/ many registrations.

2) Redundant personnel

3) Fragmentation of organization - activities

4) Authority highly centralized

5) Low training - management development priority

6) Management Information - Control Poor

7) Construction Management Fragmented -

8) Lack of skilled personnel (low prestige; low wages)

1981: BEHEIRA: PROVINCIAL POTABLE WATER SUPPLY PROJECT

Sector Constraints

1) Fragmentation of responsibility for operations.

Organization Options

a) Compatible administrative boundaries
b) Coordination/relation with other sectors.
c) Rationalize of manpower
d) Form separate public water companies with a Central (national) Coordinating body.

2) Poor maintenance and operations.

3) Excessive water losses

Progressive tariffs - Cost Recovery Phased in over several years

4) Inadequate investment levels

5) Shortage of skilled staff

Massive training component with both national and regional training centers.

6) Low tariffs and poor cash recovery

Phased in rates over period of years

Note: Public Co's Operate under
a) Law 47/1978
Law 60/1971

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1982: BUILDING CAPACITY FOR DECENTRALIZATION IN EGYPT: THE PILOT PROJECT AND BEYOND
3 Governorates Involved
Assuit, Garubyia, New Valley

Constraints/Obstacles

1) Absence of Planning/Management systems which relate resources to functions to outputs.

2) Limited management and administration capacity to maintain systems once in palce.

3) Limited of ineffective use of management skills among local governmental personnel compatible with new decentralized planning and management

Lessons Learned about trainees in Egyptian setting

a)Compensation to attend expected.

b)Training Sessions should, in most instandard GOE working stances conform to hours.

Lessons Learned from Pilot Project

a)Action approach beneficial. Teach with reference to their system skills development within operational context. Follow-up necessary.
b)Decentralization loosely defined concept.

c)Local official actively seek greater involvement in planning and implementation. At same time regard central and regional offices necessary.

d)Much of the expertise needed to improve local governmen exists within Egypt and can be effectively used if assisted with identification and design of new approach
e)Although the pilot project focused primarily on units o local government, regional planning officers are import participants in the long-term program in order to relat local initiatives to national parameters and priorities address area-based needs and resources, and effectively utilize specialized expertise.

Structure: Action Oriented Approach
a)Action orientation + problem solving
b)On-going consultation
c)Skills training
d)Specialized technical assistance.

1982: PP DECENTRALIZATION PLANNING AND MANAGEMENT
LAD

Managerial Constraints

1)Absence of well defined planning budgeting management procurement and systems

2)Limited and inefficiently utilized skills of local government personnel

3)Limited management administration capital of government councils.

4)Limited participation of elected of councils and other local officials

Strategies

1)Analyzing the inefficiencies and constraints within the present governorate planning, budgeting and management process;
2)Assisting governorate councils develop planning guidelines and management procedures that help to define and implement their new responsibilities to develop plans and projects based upon local needs and with the involvement of local elected councils;
3)Assisting governorate councils identify a variety of financial resources and use them in development projects;
4)Organizing and implementing a variety of training activities in the governorates and elsewhtere, to improve the planning, budgeting, and management skills of local personnel;
5)Providing continuous advisory assistance to local personnel as they apply the new guidelines, procedures, and skills;
6)Implementing a selected group of development projects in each governorate as tests of the new planning and budgeting processes and to provide on-the-job management training;
7)Assisting governorate councils monitor and evaluate the effectiveness of the new procedures as a basis for improving them and extending the assistance to other governorates;
8)Improving the training and consulting capacities of Egyptian organizations, particularly ORDEV's Sakkara Center, the regional planning offices and regional universities, so that the assistance begun by DPM can be sustained;
9)Developing a monitoring and evaluation system that will provide data to indicate to village, markaz, governorate, regional and central planners, under what conditions decentralized planning and management is more effective than centralized planning;
10)Residential technical assistance teams will work in three governorates, and at Sakkara, in the first and second years and, over the remaining 4 years, will be expanded to include all other governorates who formally request assistance and agree to commit staff and funds for improving their planning, budgeting and management.

BRIEFING PAPER: 1982 AID/W

(Issues) Sector Problems	Recommendations
1)Inadequate investment levels	a) Establishment of a reliable system to generate revenues, for o/m primarily through user charges. b) Shift GOE financing of infrastructure investments from a grant to a loan basis to generate capital reflows.
2) Low Tariffs - Poor Cost Recovery	a) Tariff Reform - Progressive Tariffs b) Cites Behera Public. Companies as progress Phase I: Revenues to cover operational and maintenance. 5th year: Revenues to cover operational and maintenance + debt service.
3) Fragmentation of responsibility of operations	a) Rationalization of sector including strengthening local management & technical capabilities while retaining central coordination of sector policies.
4) Shortage of Skilled Staff	a) Substantial (USAID) investments in training - sector side. b) Assess present/future manpower needs c) National level/planning
5) Poor O/M - Poor Service	Immediate attention with technical assistance
6) Excessive Water Losses	

Literature Review
(In Chronological Order)

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5) Evaluation: Middle Management Education Program, Pilot Activi
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6) Assessment of Management Training Needs in the Arab Republic o Egypt.
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7a) Management Diagnostic Review of Alexandria General Organizatio for Sanitary Drainage.
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9) Study of Training Needs of Seven Governorates.
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11) Decentralization Planning and Management.
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Reviewed
Not Summarized

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2) Management Development in Egypt, Salah El Sayed, AUC Press, 1980.

ANNEX K

DRAFT GOE WASTEWATER WAGE LAW

ANNEX L

CAIRO, ALEXANDRIA, AND CANAL CITIES

WATER AND SEWER PROGRAM

CAIRO, ALEXANDRIA, AND CANAL CITIES WATER AND SEWER PROGRAM

BY
ROBERT S. MCGARRY
SBA CONTRACT 3-83-1-5133

PROGRAM REVIEW:

The past USAID assistance to Cairo, Alexandria and the Canal Cities for water and sewer has been master planning and design.

At this point, the planning is complete (as far as AID is concerned), much of the design is complete or could be completed within 2 years. It is possible to start construction and implement these plans over the next five years.

The GOE has asked the US for an additional $1 billion in the water and sewer sector during FY83 to FY87. The GOE further requests that AID concentrate the additional $1 billion of assistance in Cairo, Alexandria and the Canal Cities. The construction of the facilities contemplated by AID for these three areas - Cairo, Alexandria, and Canal Cities could:

a. Obligate and expend more than $1 billion over the next 5 years.

b. Dramatically improve the sewer conditions in these cities.

A decision to proceed with this large program is recommended in the sector strategy. However, I believe the problem areas below have not been resolved and jeopardize the ability to expend $1 billion but more important seriously jeopardize the improvements in water and sewer services.

a. Concurrence by the GOE with the specific projects contained in the sector strategy.

b. The GOE's capital program for water and sewer for the same five year period is not known.

c. AID has not decided how to manage a large water and sewer program.

d. Little or no progress has been made by the GOE to insure that management and financial capability in the sector will improve enough to operate and maintain the completed facilities.

Elaboration of these concerns follows:

1. Approval by GOE of AID five year program
It is not clear that the GOE has accepted and approved the projects that make up the 5 year recommended investment program. GOE approval and support of the total 5 year planned program prior to committment a US resources is important. For example, the Cairo West Bank wastewater project is a collection system to remove sewage from Cairo. No treatment is included in the AID strategy. If the GOE were to take the position that the system could not be operated until treatment is provided, the investment in the collection system would not be wise. It is assumed that the GOE accepts stopping the flooding and pumping sewage away from Cairo as important enough to allow discharge of the sewage that the West Bank project will deliver until a treatment facility is provided. The proper authorities in the GOE must fully understand this potential, if the Japanese plant is not completed in time, and accept and approve the West Bank Concept.

2. A GOE plan for their capital program for the same five year period
Two aspects of the GOE capital program are of concern, funding and execution. In Alexandria for example the AID Phase I program is the construction of several major pumping stations and the rehabilitation of two sewage treatment plants. The AGOSD is to finance and build at the same time the collectors and interceptors that bring wastewater to the pumping stations and plants. If the GOE does not provide sufficient capital or if the construction is delayed e AID pumping stations and improved plants car not be used effectively to relieve the wastewater flooding. A binding committment by GOE for the funding and execution of their share of the five year program is essential.

3. Program and Construction Management by AID
The sector program to date has been mainly planning and design. During this phase AID staff were generally involved in selection and management of consultants and technical overview of planning and design.

   At this point it appears that AID must insure the following capabilities are available.

   a. To work with the GOE to achieve the following:
      (1) obtain approval and understanding of the AID sector program (see preceding paragraphs)
      (2) Develop a fully coordinated GOE sector program (see preceeding paragraphs)
      (3) Improve the GOE management and financial capability

b. To manage a very large construction effort to:
   (1) insure quality construction
   (2) insure timely completion
   (3) Resolve technical issues and changes
   (4) Avoid claims and other contract disputes.

c. To provide management and financial information and documentaion to protect the US investment and meet regulatory requirements.

4. Improvement in GOE Management and Financial capability to insure the completed projects will be operated and maintained

All the planning and management studies have clearly indicatd the ned for management and financial reform. I see no evidence of a national committment to address any of the identified problems. The US offered additional funding up to $1 billion "on the condition that the institutional defects that led to the present situation be eliminated."

It is probably impossible to correct the institutional defects quickly and AID faces a very real dilema:

If the projects in Cairo, Alexandria and the Canal Cities are held up until institutional reformms are all achieved the health problems will continue and probably get worse, inflation could significantly decrease what can be achieved, the continuity of the design consultants will be lost and most important the people are asked to pay more for sewer and water service that is grossly inadequate. If the major projects are tendered as soon as possible (as currently planned and recommended in the sector strategy) AID loses most of its leverage for reforms because once a contract is awarded future obligations can not be withheld.

I believe the recommended strategy that obligates large amounts in FY83 and FY84 without any progress by the GOE toward correcting the financial and management deficiences is too risky

In the US, EPA and their grantees followed this same strategy - obligate and build now; worry about finance and management later - with very poor results. It is now "later" in the US and the financial and management problems are very real and very harmful, "later" will be far worse in Egypt.

SUGGESTED SECTOR STRATEGY

I believe the first step is an AID policy decision that substantial proress in institutional reform by th GOE is indeed a prerequiste to future obligations by AID. In my judgement, this is a major change in current AID policy that favors obligations and completion of projects.
Such a policy change will probably be very disturbing to the GOE and may be resisted. Th US must be certain of the decision and stick to it. The US must be prepared to forego obligations and delay projects.

Having advised the GOE of this polciy decision, I would request they designate the institutions and individuals who will negotiate with AID to develop plans for reforms that will meet this requirement. It is obvious that institutional reforms will only be guaranteed if authorized by very high level officials in Egypt, so high level Egyptian authorizies must be designated. If they are not willing to designate such authorities the reforms will not be guaranteed.

AID must also designate appropriate personnel with the responsibility of working with the GOE to develop the institutional reforms.

Recommend that the objective of negotiations is to guarantee the following:

- Enterprise financial systems for water and sewer in Cairo, Alexandria, and Canal Cities (i.e. water and sewer systems basicly financed by revenues from sales that are retained by the water/wastewater organizations and not returned to the national government).

- Tariff reforms for water and wastewater to generate agreed upon level of financing (see below regarding subsidies) to be intiated as major improvements are completed and phased in over 5 years. (see also later comments regarding tariffs)

- Agreement regarding government subsidies for water and wastewater after tariff reforms are complete. (see later general comments regarding subsidies)

- Agreement on adequate O&M bugets for the next five to eight years.

To help guarantee the above and to insure the projects are started operated and maintained until management is improved, agreement by the GOE to finance and award contracts to start-up, operate, maintain, and train Egyptian personnel for the major facilities (pump stations and treatment plants) in these projects for 3 years. AID to have final approval of the tender and competence of the selected firms.

Agreement on a general management improvement plan.

Formal approval of the specific AID projects.

Agreement on the GOE matching capital program for water and wastewater.

I suggest that substantial progress toward reform rather than complete reform should allow further US obligations. For example, considering the US committment and the fact that the Canal Cities projects are ready for tender and there is little time for GOE reaction, an agreement by GOE to fund start-up, operating and maintenance contracts for 2 to 3 years would be a sufficient guarantee that the US financed facilities will function properly to allow obligation of the $87 million. Tariff increases, tariffs for sewer, bugets, etc. would be negotiated during construction.

GENERAL COMMENTS

FINANCIAL MANAGEMENT

The first basic keystone of financial management should be that the water and sewer systems are managed as enterprise funds not general operating funds. The revenues must be retained by the operating agency and be used only for water and sewer.

The scond basic keystone of financial management should be that consumers pay for water and sewer service. While some major utilities still do not charge for water and/or sewer based on metered consumption, it is generally agreed that metered consumption is best and Egypt should charge for water and sewer service based on metered water consumption.

Tariff

Assuming that enterprise funding concept is adopted, then tariffs for water and sewer are needed that produce revenue to pay expenses. Two policy issues must be resolved.

a. What expenses are to be paid from revenues?

b. How will the expenses be distributed among the consumers?

It has been recommended that tariffs match operations, maintenance and depreciation by 1987 and total costs including debt service and return on fixed assets by 1992.

I agree that tariffs as a mimimum should match operations and maintenance costs but not necessarily by 1987. Rather than a fixed date, I believe increased tariffs should be phased in as system improvements come on line.

I very strongly disagree that revenues provide a return on investment in fixed assets. No country has this policy and it is WRONG! What would be done with the return - subsidize some other sector? - provide a return to AID or other donors to go to the Treasury? -

I also disagree that tariffs should cover depreciation. First, a properly maintained water and sewer system will not depreciate - maintenance, repairs, and replacements will continuously extend the life of the system. Second, as a practical matter accumulated surplus will probably be used to a) lower tariffs or b) withdrawn and used for other than water and sewer purposes. An accumulated surplus in publically owned utilities is too GREAT a temptation for government.

Debt service, is a major policy issue. For example water and sewer rates in the US cover debt service, but Federal grants for pollution abatement are not debt. I believe the AID grants and perhaps part (but not all) of GOE capital contribution could be considered a grant and not a debt burden. However, if the GOE requires the Cairo, Alexandria, and Canal Cities utilities to treat grants as debt and repay, capital will be generated for other projects in Egypt. There is merit in either approach - grants or debt - and it should be decided after careful analysis of what is best for Egypt.

Once a level of revenue necessary to operate an agency has been determined after the considerations above a tariff can be designed that determines how expenses are distributed among consumers. The BVI/Kearn tariff study recommends an "Ability to Pay" increasing block tariff.

I strongly concur with this type tariff but recommend the name be changed to "Demand Structured" tariff. This type tariff causes those who put higher demands on the water/sewer system to pay more for the availability of the capacity they use.

I initiated a tariff, almost identical to what BVI/Kearry recommended and have 5 years experience that it works to distribute costs more equitably and reduce water/sewer waste.

However, any tariff reform will fail unless the metering and billing is improved. Tariff reform without meter improvement is marginal. (see comments on metering)

Subsidies

At the International Water supply Conference, in Zurich, Switzerland in Sept. 1982, there was an excellent session on tariff practice world wide. The subject of government subsidies was discussed and more countries subsidize water than not. Well developed countries such as Norway, Scotland and Australia subsidize water service and almost all underdeveloped countries reported some form of subsidy.

A decision by the GOE to subsidize water and/or sewer service is neither wrong or poor practice. However, I do believe that if the decision is made to subsidize, then the annual subsidy must be made known to the operating agencies and tariffs set to cover the difference.

I would not adopt a position at this time oppossed to subsidies. Instead the issue should be negotiated with the GOE.

Water Meters

Corrections of the deplorable state of meter maintence, meter reading, and billing is one of the highest priority needs for good management. The problems have been known for years but there is no progress - only procrastmation. This is not a complicated, highly technical issue involving a long planning period. I think it should be completely corrected with 3 years. I also believe good metering and billing is a most important (may be the most important) element of financial independence for the water and sewer sector.

Construction Management

The sector program is a very large construction effort much of it by US contractors. Management of the construction for a program this large requires a significant effort, and skill.

For Alexandria and the Canal Cities it appears that the best method of management would be for the consultants who designed the project to handle this function. Designs are almost complete and the consultants have established a relationship with the clients that has a good prospect of successful management of US contracts.

It is my impression that the sewer agencies view the contracts to be build by US contracts as a type of "turn-key". This is promising because it is probable they will delegate management to the consultants.

Before work starts, a construction management plan must be ready. AID should encourage maximum delgation by the wastewater agencies.

The design and construction at the West Bank sewer project is complex, expensive, and difficult to manage. The US Army Corps of Engineers (COE) has proposed an excellent design, construction management concept to AID. I believe the COE has been somewhat optimistic about the time to complete the project but it is a sound plan. Management by the COE appears to offer the following:

a. The cost of management should be about the same because others will have to provide the service if the Corps does not. Design costs will be less.

b. AID can delegate contract authority to the COE but not too others. AID would be relieved of a significant administrative burden.

c. I firmly believe bids would be significantly lower because US contractors would not have to protect themselves against the risk of contracting with an Egyptian agency. They know the COE procedures whereas Egyptian procedures are risky.

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Start-Up and Initial Operation

It has been my experience (and the experience of almost all utility managers in the US) that the start-up and initial operation of wastewater plants and pumping stations is extreamly difficult. Despite the best possible design and closely supervised construction, pumping stations and treatment plants are an exceptional technical and management challange during the first few years.

In Egypt this problem will be even more severe. There are several Egyptian examples of new facilities that were never operated because of "start-up" problems.

Strongly recommend that AID insist on GOE financed contract operation and maintenance of the new pumping stations and treatment plants for 3 years or until it is agreed by AID that the financial and management conditions of the operating agency have improved sufficiently to forego contract operation.

The proposed contractor would use mostly Egyptian personnel and eventually train agency personnel before turning the plants over.

The contractor would establish and document a systematic maintenace system to include repair parts procurement and storage.

This long term contract would firmly establish good operation and maintenance practice and demonstrate the benefits to the Egyptian agencies.

Annual Budgets

The operating and maintenance budget for the water and sewer utility is the major management tool of the agency executives. By allocating funds and personnel, the executive controls the operations and maintenance. He establishes the levels to be achieved within the reasources available. Budgets will probably never be adequate for any utility to accomplish everything so wise use of resources is important.

However, if the budget is far below minimum requirements even the best managers can not prevent serious deterioration.

I suggest that AID become far more involved in operating and maintenance budgets for the Cairo, Alexandria, and Canal Cities sewer agencies. If the sewer utilities are to operate and maintain the completed projects, reasonable budgets and wise allocation of resourses is essential. AID has a stake in the wastewater systems and should try to assume a budget advisory and support role.

How this involvement will come about and by whom, will vary. For example, the Boyle personnel in Alexandria are in a position to take this mission if AGOSD will cooperate.

Management Improvements

The improvement of management in the operating agencies will be a slow process. Patience, innovation, and technical skill are required.

The management assistance contract in Alexandria, after two years, appears to be improving the situation. Suggest similar type contracts for the three Canal City governorates and Cairo. Also suggest patience.

In addition, it could be helpful to arrange a direct relationship with US sewer agencies (or Public Works Department) for Alexandria, Cairo, and each of the Canal Cities sewer agencies. The Washington Suburban Sanitary Commission has mutual cooperation agreements with the Aman Water and Sewer Agnecy and the Water supply Corporation in Jordan and the Yaman Water and Sewer Agency. We have had 20 to 30 Jordanian and Yemenese personnel in the US for all types of orientation and training. We have also supplied a great deal of technical advice by mail. I believe we have helped. As a minimum, visitors and trainees have had an opportunity to observe well maintained and properly operated sewage and water systems. WSSC responded to requests from the Jordanians and Yamenese and were not advisors. WSSC can not handle any more but other US agencies probably would if AID insured they were reimbursed.

Pollution Abatement

The AID planned projects in the West Bank of Cairo and the Canal Cities do not reduce the pollution caused by wastewater. The wastewater flooding will be abated which will be a dramatic health and environmenal improvement but the wastes will still be discharged into Egypt's waters.

In Alexandria, the AID approved plan is designed to stop the pollution of the Mediterranean Sea and Lake Maryout. However, Phase I of the project, while also dramatically improving collection will provide marginal pollution abatement. It is not until the completion of Phase II, that there will be better abatement and Phase II may well be outside the $1 billion program.

The planned AID programs in these three areas, will result in dramatic environmental and health improvements, but large additional capital investments will eventually be required abate pollution. This should be recognized by the US and Egyptian senior officials. Someday, somehow a very large further investment will be requied.

ANNEX M

ENVIRONMENTAL HEALTH IN EGYPT

Environmental Health in Egypt

Prepared for
Health Sector Assessment
Phase II

USAID/Egypt

by

Glenn Wagne

Water & Air Research Inc.
Gainesville, FL 32602

ENVIRONMENTAL HEALTH

Introduction

The matter of personal and environmental hygiene is the overwhelming problem to be overcome for improving the health of the general population. In order that hygiene may prevail there must be:

1. an ample supply of potable water within the home;
2. a sanitary means of removal and disposal of the waste water from the immediate premises and the community;
3. a sanitary means of removal and disposal of refuse and garbage from the home and community.

These basic ammenities are available to only a small portion of the population of Egypt. While hard statistics are not available, good estimates are:

	Urban	Rural	
Water supply within the home*	61%	4%	(1976)
Sanitary sewer service*	22%	2%	(1976)
Sanitary refuse disposal	N/A	N/A	

These are quantitative estimates. Many water treatment plants are delivering water of questionable quality due to operation and maintenance problems within the plants.** Binnie, et. al. engineers visited 95% of the regional and municipal systems and 25% of the rural works. They "identified an urgent and nationwide need for rehabilitation of existing source works and distribution systems." Neither sanitary sewer or refuse disposal service is available to the great majority of the people.

A confirmation of the general lack of good water supply and sanitation service is contained in the United Nations Demographic Yearbook of 1971.* It shows that Egypt is among the nations with the highest child (under five) and infant (under one) death rates.

The total lack of basic sanitary services to a large portion of the population and the precarious state of those available casts a shadow over all aspects of public health in the country. This matter has been

(*) Environmental Health in Egypt - WASH Field Report #33 - 1982
(**) Binnie-Taylor, et. al. - Provincial Water Supplies Project - 1980

documented and reported fully and it would serve no purpose to further elaborate here. The important problem is to get on with an over-all solution.

The most alarming aspect of this situation is the growing deficit in water supply and sanitary waste disposal services. As Fig. 1 clearly indicates, the population is growing rapidly while the provision in these basic services is falling farther and farther behind. A national committment and massive effort will be required to turn this situation around. It will be difficult, slow and costly because the factors involved are cultural, historical, legal, institutional and financial. These things can't be changed or detoured easily or quickly. While they present formidable challenges, the social and economic consequences of not finding a solution will be far more costly.

Investment Required to Provide Water and Sewer Service

Two very extensive(***) reports have been made which attempt to quantify the capital investment needs and the possibilities of meeting them. The proposed solutions are based on a complete turnabout in the management and administration of water and sewer utilities along with customer service charges, which not only cover an adequate level of administration but also full debt service and routine replacement and extensions.

The macro numbers of proposed investment for the next 20-25 years for large cities and provinces is given below in millions of 1979-80 Egyptian pounds.

	Water			Sewerage			
	Local Source	Foreign Source	Total	Local Source	Foreign Source	Total	Grand Totals
Greater Cairo	1104	691	1795	2461	779	3240	5035
Greater Alexandria	288	121	409	1174	385	1559	1968
Ismailia	156	59	215	221	118	339	554
Port Said	95	31	126	152	42	194	320
Suez	198	117	315	251	36	287	485
All other Governorates	850	850	1700	1000	1000	2000	3700
	2691	1869	4560	5259	2360	7619	12279

	Local Source	Foreign Source	Total
Water	2691	1869	4560
Sewerage	5259	2360	7619
	7950	4229	12279

(***) Binnie-Taylor et. al.
Black & Veach International

Generating the Resources

The heart of the problem is financing. Unless this is faced head-on there is no hope of significant progress. A firm financial base is necessary for orderly planning and project execution and for sound, responsible management.

The present method of financing and administering the water and sewer utilities is completely deficitary and chaotic. The result is a serious deterioration of the physical facilities and a precarious level of service. The only hope of generating the kind of funding required is through customer service charges. The studies of rate structures to amortize the capital and provide good operation and maintenance clearly indicate that even the people in the lowest rung of the economic ladder can meet the payments. This would amount to a maximum of 3 to 5% of their income for both water and sewer service charges. Many are paying more than this at the present time for very inadequate and inferior service. In poorly served areas members of the family spend several hours a day carrying relatively small amounts of water from distant standpipes to their homes. The more affluent, the commercial and industrial establishments, can obviously pay reasonable rates.

At the present time rates are very low or non-existant and service is bound to be poor. The rates therefore need to be raised slowly as service improves. Over a period of say three to five years the rates could rise from the deficit situation now to one which covers all costs. At the same time the increased income will allow for improved management and better salaries across the board.

Organization of Financing

The second measure, along with customer service charges, needed to turn this situation around is to put water and sewer utility financing on a loan basis. A National Water Supply and Sewerage Revolving Loan Fund should be established in a national development bank. All funds from all sources, national and international, could be channeled through this fund. The capital investment then in large city and provincial water and sewer systems would be obtained from the bank through loans.

In phase with the government decentralization the water and sewer systems will be the responsibility of the governorates. This will result in governorate-wide program planning, administration and operation. In order to finance their capital programs the governorates must have area-wide feasability studies covering their long-range goals, 20 to 25 years, as well as their immediate, say five-year, plans and requirements. The feasibility studies would include not only capital needs for construction and rehabilitation but also administration, operation and maintenance plans. This would include organization, personnel levels, administrative costs, training plans and obviously the water and sewer service charges to provide the required income.

This method of programing has many salutary and beneficial effects. 1) It takes the government out of the grant business and out of a system which has never provided the general population with adequate service in any country; 2) It provides a chance for using scarce investment capital many times over; 3) If money must be repaid the loanee is apt to be more careful that it is well used. That is, the project is well-designed and constructed and will be maintained; 4) The central government gets out of the business of having to make project choices but rather puts the burden on the governorates; 5) The governorates, at the same time, are obliged to do serious and constructive planning for which the National Revolving Loan Fund can hold them accountable. Good planning and good management will be rewarded as it should be. 6) There will be a very significant stimulant for the Egyptian engineering profession much of which is poorly employed in the public sector.

The existing National Organization for Potable Water and Sanitary Drainage in the Ministry of Housing and Reconstruction (HR) could become the technical arm at the National Revolving Loan Fund. It could get out of the business of trying to provide services to the governorates. They would review the feasibility reports, approve or disapprove, and given the normal starts and stops the individual projects of the governorate plans would be approved for final design followed by construction financing. Very poor construction practices are apparent everywhere so that serious construction supervision should be part of the National Revolving Loan Fund policy.

The Fund would finance the feasibility studies, the detailed design, construction supervision and, of course, construction of the works.

In the many interviews and discussions with people in the GOE, on the bureaucratic level, there is evidence that the required reforms could be made. On the matter of financing, funds from the central government now channeled through the National Investment Bank which finances public sector activities including water and sewer projects. The interest charged depends on the project and varies from 0 to 15%. Presently no interest is charged on the water and sewer funds. Although they are called loans they are not regarded as such by the water and sewer agencies which receive them. This could be changed however by executive action but in order to be feasible would have to be accompanied by a means of charging for services so that the capital could be recovered. In this latter aspect, which is political, the bureaucrats could not answer with any degree of certainty.

There is total agreement however on one thing. That is, if funds are to become available in the amounts necessary to make any significant improvement and expansion in providing water and sewer services, the consumer will have to pay the cost--operation and maintenance as well as capital recovery.

While charging for services seems to be a touchy subject water and sewer projects are very popular among those on city fringes and in rural communities who don't have them. If a proper selling job is done it is likely that a reasonable rate would be acceptable. The cut problem has been that the great majority, with good reason, resist paying for poor or public standpipe service. The test needs to be made of their willingness to pay for good service in their homes.

Further evidence is contained in the World Bank loan to GOE for a water and sewer program in the Governorate of Beheira. The Bank has agreed to disburse their loan based on incremental raising of the customer service charge over the first five years. At the end of this time the rate is designed to be at a level to cover all operation and maintenance costs. During the succeeding five years the rate will continue to increase in order to cover the loan amortization as well as operation. At the end of the ten-year grace period the returns from revenues are designed to be at a level which will cover total cost--fixed and operational.

In Fig. 2 is a simplified graphic presentation of the operation of a revolving loan fund based on assumptions for investment and capital recovery. Obviously if the rate of investment is lower more time will be required before the returns from loans will cover the investments. Similarly with the repayments. The more lenient the terms, longer grace period for example, the more time required.

Fig. 3 shows how a loan fund could operate between the National Investment Bank and the operating agency in the governorate.

At the present time several bilateral agencies other than USAID, namely German and Japanese, are discussing assistance in this area with the GOE. It would be highly desirable that all aid agencies follow a similar policy on the matter of customer service charges. This would appear quite logical since providing a capital improvement without assurance of good operation and maintenance would be a complete waste of resources. This is not a fantasy because many of the systems constructed in the past five to seven years are in a lamentable state of repair. The initial disbursement of the World Bank Loan for Beheira will be used for rehabilitation of recently constructed works.

Technology

Protection of Egypt's Water Source

The Nile River is THE source of water for Egypt. Water is taken directly from the river or the extensive canal system for treatment or from the ground along the bank or in the Delta where infiltration has formed a ground water table. This water resource is indispensible to the nation and must be protected at all costs. At the present time most of the wastes of the people and industries of the Nile Vale find their way into the river. They go directly through surface outfalls or by leaching from the soil. From the point of view

of the Nile as a vital resource the pollution from human wastes, while not desirable, is the least important. The industrial wastes, a direct and normal consequence of development, is the danger, along with pesticides and increases in salinity from the extensive irrigation systems.

The control of industrial and agricultural wastes cuts across ministerial lines but regardless of the complexities, requires serious and continuous attention. The Ministry of Health has a clear responsibility in sampling and monitoring. Control, however, will require those ministries involved in industrial development, natural resources, and agriculture, along with the governorates in which the industries and agricultural areas are located. Specific wastes require specific treatment which will vary and a system must be designed for each waste problem.

Treatment from Municipal or Regional Sewer Systems

There is no question relative to the need for sewerage systems to collect the liquid wastes from the community. With the concentration of population along the Nile River and its canals in the Delta there is no alternative to collection and treatment. The only question is what kind of treatment should it receive. "There are no simple solutions--only intelligent choices."(1)

Primary treatment is necessary for all wastes and secondary treatment will be required for some. Specific guidelines are beyond the scope of this consultation but should be high on the priority list for immediate attention. Generally speaking, however, serious consideration should be given the use of oxidation ponds even though they occupy some areas useful for agriculture. The effluent from the ponds is rich in nutrients and can be used for irrigation of many crops. Imhoff tanks will solve the problem in many places. Trickling filters will provide a solution where the volumes are beyond the range of Imhoff tanks. In some places the two in sequence will solve the problem. All sludge should be dried and used for soil conditioner.

The secondary treatment options are many but the first priority is to keep it simple"(1) and avoid high energy intensive solutions."

Filtration of Nile Water

There are a number of advances in water treatment that can significantly reduce costs. None of these is evident in any of the present design or plans for the immediate future.

The first of these is--Direct Filtration.(2) Many plants in the U.S. and Canada are operating in this treatment mode. Essentially the method is one of

(1) Harris Seidel - Wastewater Treatment Guidelines - Jordan.
(1) F. Montanari - Civil Engineering - March 1981
(2) Low Dosage-High Rate Direct Filtration, E. G. Wagner and H. E. Hudson, Jr., AWWA Journal.

adding only enough coagulant or polymer or a combination to destabilize the colloids so that subsequent filtration is the only treatment necessary. The expense of large flocculation and settling structures can be eliminated. Furthermore, and highly important, the amount of coagulant to attain destabilization is far less than that required to form a settlable floc. The saving in plant size is an important reduction in capital required while there is a further and larger economy in reduced chemical costs which goes on for the life of the plant. Given the high cost of importing chemicals this is significant, not only for economy but also, foreign exchange.

Furthermore, the rate of filtration probably can be increased significantly over that which is now the practice in Egypt. This will reduce the cost of the filter structures.

The Nile River water and the main canals which are the source of the surface water treatment plants, is quite clear and the possibilities are excellent for direct filtration. The main problem is algae which cause difficulties in filters. Egypt has bituminous coal which can serve as a filter media and which handles algae much better than sand filters.

The combination of a water source apparently ammenable to direct filtration along with the high cost of chemicals and the availability of coal makes it urgent to begin utilizing the direct filtration treatment.

Plant Rehabilitation

Another urgent matter is the rehabilitation of many water treatment plants in the country which are in a very poor state of repair. These should not be given the conventional repairs to put them back to their original state. Since major work needs to be done, innovation and more effective process design should be introduced. For example, old plants with good structures can be revamped to produce two or three times as much water as the original design. This is done by introducing more efficient flocculation, high rate settling, and dual media, high rate filtration. For the same investment the old plant can be rehabilitated and upgraded to produce two or three times more water of better quality. If, for example, a dual media filter with Egyptian coal can be designed, the only part of these old plants (some not so old) which will need attention is the filtration.

Water Losses

The distribution and transmission systems are also in a poor state of repair. Water losses in the system are estimated from 40% to over 60%. These are obviously intollerable. There is simply no way that any water utility can operate effectively under these conditions. Most of these losses are in the piping system. Broken and damaged pipes, valves and fittings need to be found and repaired. Operation of the treatment plant needs tighting up to reduce wastes to a minimum. The metering system needs a complete overhaul to improve

quality of the manufacture and develop a maintenance and repair system which will extend the life of the meters. It should be emphasized that in all countries everywhere--meters are the best conservation measure. Wastage on the customer's premises is cut to a minimum when he must pay for it. Meters are expensive, but they pay for themselves.

Pressure Problems

All reports on the water systems emphasize the water losses, but little is said of pressures. Since a very large investment has been made in the piping system, the capacity is vital to its function. Undoubtedly it has lost some of its capacity due to corrosion or deposition on the pipe walls. The extent of loss of flow capacity needs to be determined. If it is an important factor, possible cleaning and lining may be economical. Otherwise, a system of reinforcement will be needed. This can only be determined after careful hydraulic studies and testing.

Solid Wastes

Solid waste collection and disposal is described in the Phase I report (WASH Field Report #33). The problem in the large cities is much more acute than in the smaller towns and rural areas.

In a country where manpower costs are low, like Egypt, a labor intensive operation like composting has a chance of succeeding. A good example is already here. About 50% of Cairo solid waste is collected by private individuals called "zaballeen." They take the waste to an area near the city landfill where they separate the valuable waste from that which goes to the disposal area. This includes glass, bottles, metals, flatware, plastics and anything they can sell. The organic portion is fed to animals and the rest is carried to the landfill. These people receive money from the houseowner or occupant for removing the garbage, recover money from the salable items, and eat or sell the animals which feed off the garbage. It is a profitable business

An important in depth investigation of solid waste collection and disposal in the Suez Canal area was made by a Norwegian consulting firm together with an Egyptian firm. This study developed some good data on amounts and content of wastes as well as costs of collection and disposal. The average composition of the solid waste for 5 cities was:

	Percent By Weight
Food	37.1
Bones	0.3
Paper	22.6
Plastic	3.0
Textiles	2.2
Rubber & Leather	0.3
Other Combustibles	9.3
Metals	3.1
Glass	1.3
Fines	10.4
Non-Combustibles	10.4
	100.00

The quantity of waste for the area is calculated to be 0.17 tons per capacity per year. Using this as a basis for the urban population estimate for 1982:

$$19.36 \times 10^6 \times 0.17 = 3,300,000 \text{ tons.}$$

This is a continuous accumulation piling up around the country mostly littered along public areas with some disposal in poorly operated land fills.

The study further concluded that compositing was the most economical way of disposing of solid waste. Only about two-thirds of the waste is amenable to this method so that one third would be divided among that with recoverable value roug 10 percent of the total and the remaining 24 percent disposed of in land fills. Most of the latter is paper.

Information collected on transportation costs showed that door-to-door collection was the highest. It is roughly LE 15 a ton. For the great part of all cities, this is the only way to do the collection. Along with this is a transfer and transport cost of LE 2 per ton. The cost of collection and transport is calculated at LE 17 per ton.

Capital costs for composting plants are estimated to be about $ 60 per ton for plants with a capacity of treating around 100,000 tons per year. Larger plants would probably be somewhat less expensive.

Using these data, a city of one million population would generate 170,000 tons of refuse per year. Of this, somewhat more than 100,000 tons could be composted. The capital for the plant would be $6,000,000 while the cost for the collection and transportation system would be about $1,000,000.

If the plant has a 25-year life and the transport system five, the cost per family of 5 persons would be roughly:

Plant Capital Cost Per Year	-	$2.50
Transport Capital Cost Per Year	-	$1.50
Capital Cost		$4.00 per year
Operation	-	17.000 LE per year

This comes to less than LE 2 per month per family which is a very reasonable cost.

Another interestering experiment is going on in Cairo. Through the Ministry of Housing and Reconstruction, the Ministry has employed the firm of Sherif M. El-Hakim and Associates to organize and operate a solid waste collection service for an area of 12,000 people. The firm will operate the service for four months. It is now in the second month. The cost of collection and transport to the land fill is 0.30 LE per household per month. This is very low but hopefully correct.

Training

If the GOE should resolve to undertake a major program in improving water and sewer services , an indispensable component will be training. This would cover all facets of water and sewer systems from design and planning to their operation and maintenance. It would cover not only technical aspects but managerial as well.

Most of the training would be done in the country. For those categories with large numbers of personnel, it might be best to establish one or more training centers. Those would include junior administration, meter repair, pipe system maintenance, house connections, sewer cleaning. etc. Every system both large and small has these categories. Obviously there needs to be training for senior personnel as well , but this might best be done in regular short courses put on at one or more locations throughout the country.

The whole matter should be the subject of a special study in phase with the development of the entire water and sewer program. Many international organizations might be involved along with the Egyptian agencies. These include the World Bank, WHO, USAID and other bilateral programs. The World Bank is presently cooperating with the national water and sewerage agency in developing a training center in Beheira Governorate to be followed by five more throughout the country.

Both the operating and financial agencies of the GOE would have a keen interest in training since their success depends on the systems providing good service.

Experience of AID and its predecessor agencies in Latin America can be useful in Egypt. In the early years in that area, a heavy commitment was made to training sanitary engineers in U.S. universities. In later years, many of these men surfaced in key positions to make very important contributions to the success of national sanitation programs. It could be profitable to follow a similar pattern in Egypt. It might be possible to develop special concentrated courses at a specific institution for Egyptian engineers focused on Egyptian problems.

Latin America, especially Brazil, would be a good area for Egyptian personnel to see problem solutions more related to them and their situation. Many states in Brazil started out 10 to 12 years ago to develop a water and sewer program. They are now over the first hurdle and developing some maturity. The problems and agonies of the beginning are still vivid, however, and would be useful for Egyptians to know. At the national level, the Brazilian Housing Bank has been financing state programs for more than 10 years. More than 3,000 projects have been financed in 22 state programs. This would be a good stop for any Egyptian official who might become engaged in similar work here.

Recommendations

1. USAID assist the GOE in initiating a major program to provide water and sewer service to the general population. While this is a long-term program, the important (early) beginning can establish patterns of operation which will carry on after major USAID assistance stops. Any participation, however, should be dependent on the GOE's willingness to change its approach from a chaotic and deficit grant system to one of loans, and from "free" services to one in which the consumer pays the full cost of operation, maintenance, return of capital. This approach is discussed in the report.

The level of USAID financial participation would depend on negotiations with the GOE but should be substantial. The first five years would be crucial for the major investment with a commitment of additional support depending on performance.

2. If the GOE shows no interest in implementing a program recommended in #1, no further commitments should be made in the water and sewer area. Unless there can be assurances of maintenance, further capital investment is mainly wasted.

3. USAID promote the transfer of appropriate technology (simple and economical design) in three areas where there is excellent opportunity to attain significant economies in both capital and in operating costs:

A. - Rehabilitation and upgrading of existing water treatment plants;

B. - Direct filtration in the treatment of Nile River water using Egyptian coal as a filter media;

C. - Simple primary treatment of sewage by means of Imhoff tanks, trickling filters, oxidation ponds or some combination of these methods.

This can be accomplished through seminars, short courses in the country and observation visits abroad.

4. USAID assist in the development of the sanitary engineering profession by offering more fellowships for graduate training in U.S. universities and investigating the feasibility of setting up a special course for Egyptian and other Middle-East engineers in design, specification preparation, tender preparation, construction supervision and general engineering administration.

5. Providing a major commitment is made to improve and expand water and sewer systems, assist the GOE in developing a training program for all categories of administrative and operational personnel in the water and sewer utilities.

6. Assist the GOE in organizing observation visits of Egyptian engineers and administrators to Latin American countries where AID programs have made significant contributions to the development of successful national water and sanitation programs. Brazil is an especially good example because a financing program along the lines suggested in the report has been very successful.

7. Assist the GOE to carry out a pilot project of collecting and composting o solid waste from one of the medium-sized cities. Egyptian expertise and experience could be used to develop a full-sized, city-scale project. Such a project would provide management information and cost data needed for any future large-scale plan. The project should be based on consumer charges designed to pay all the costs, but phased in gradually as good service is provided.

8. In view of the vital importance of the Nile River, assist the GOE in developing an effective water quality monitoring program.

FIGURE 1.

POPULATION TRENDS AND PROVISION
OF WATER SUPPLY SERVICE

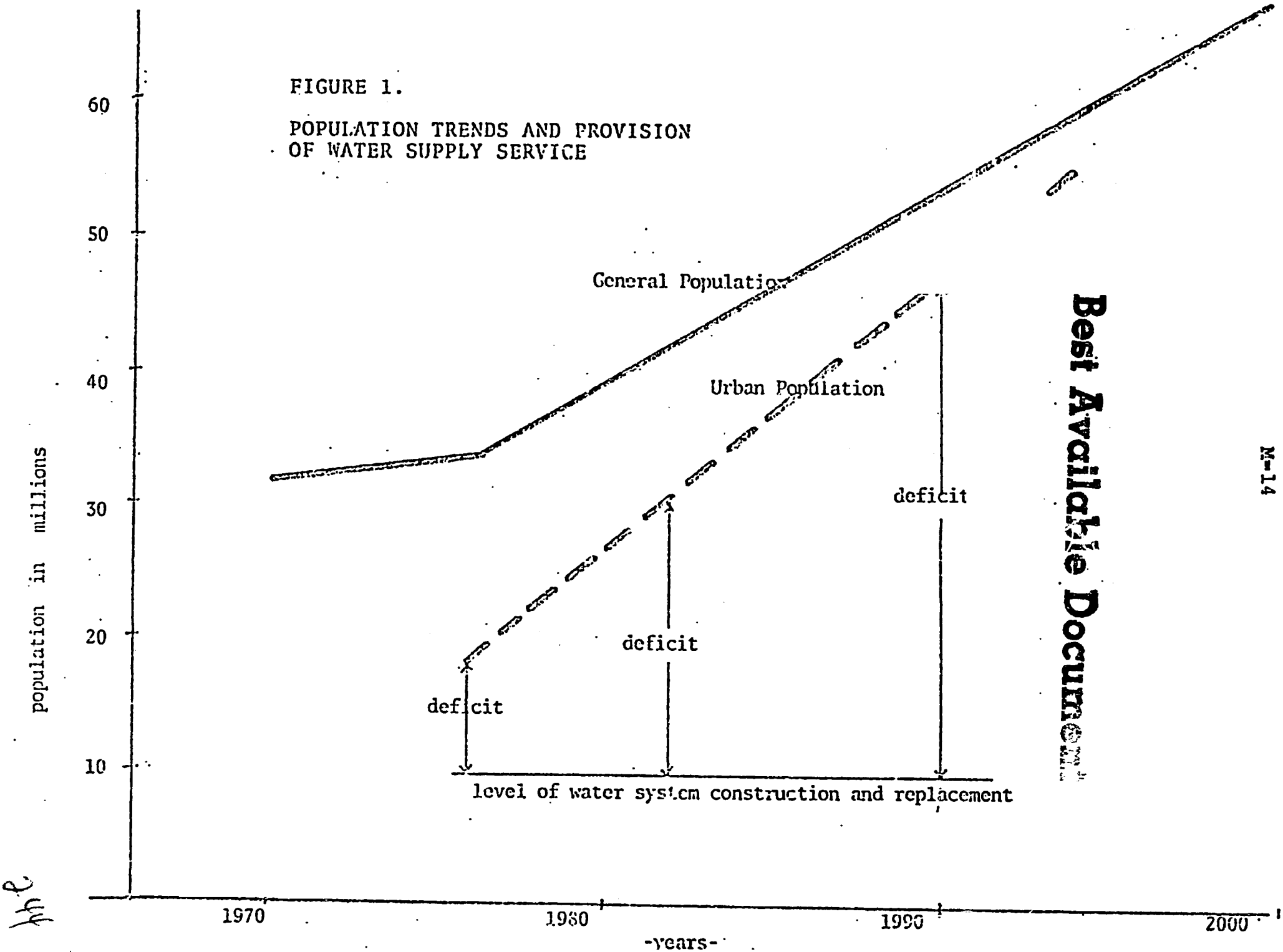


FIGURE 2

REVOLVING LOAN FUND

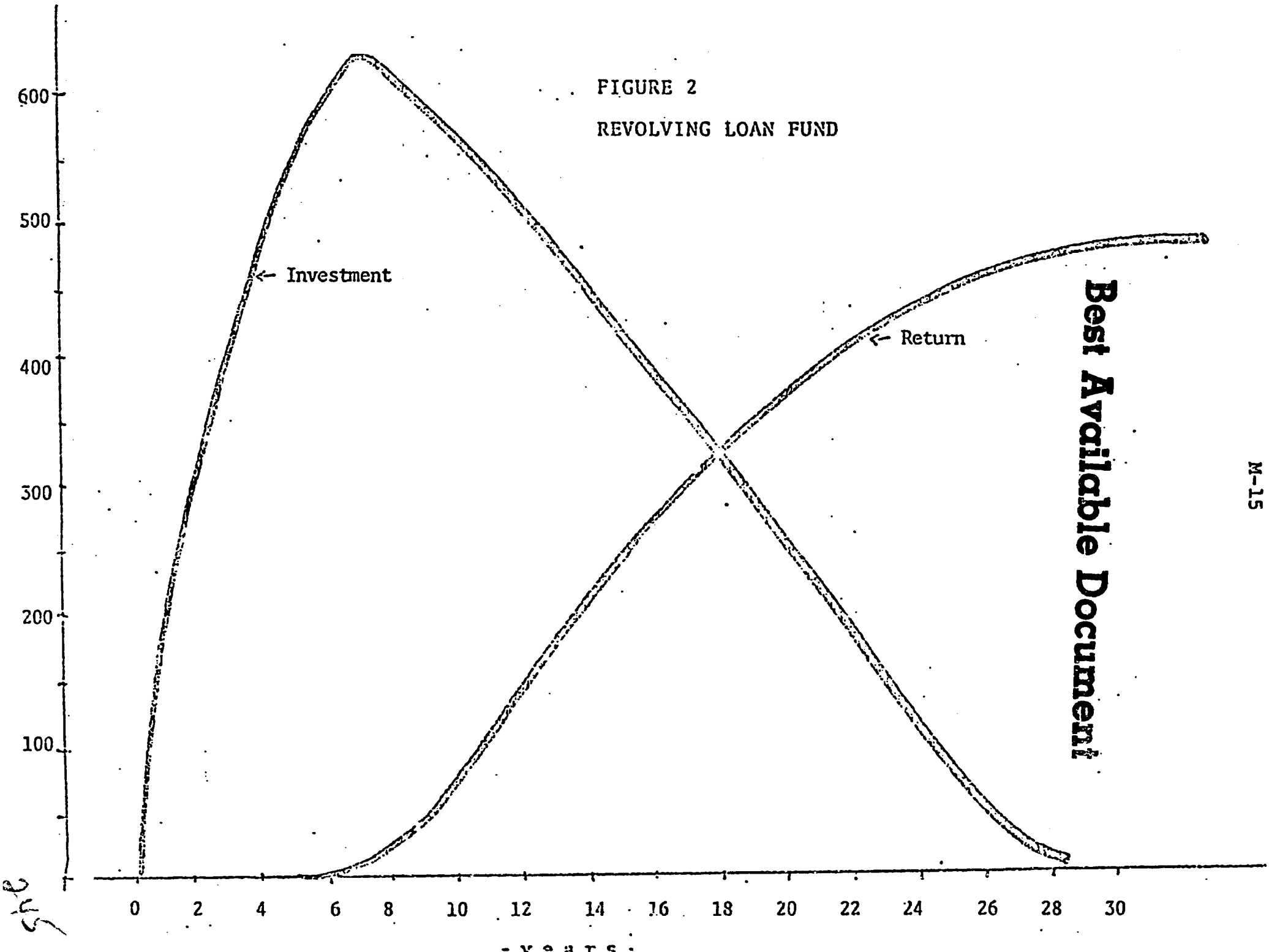
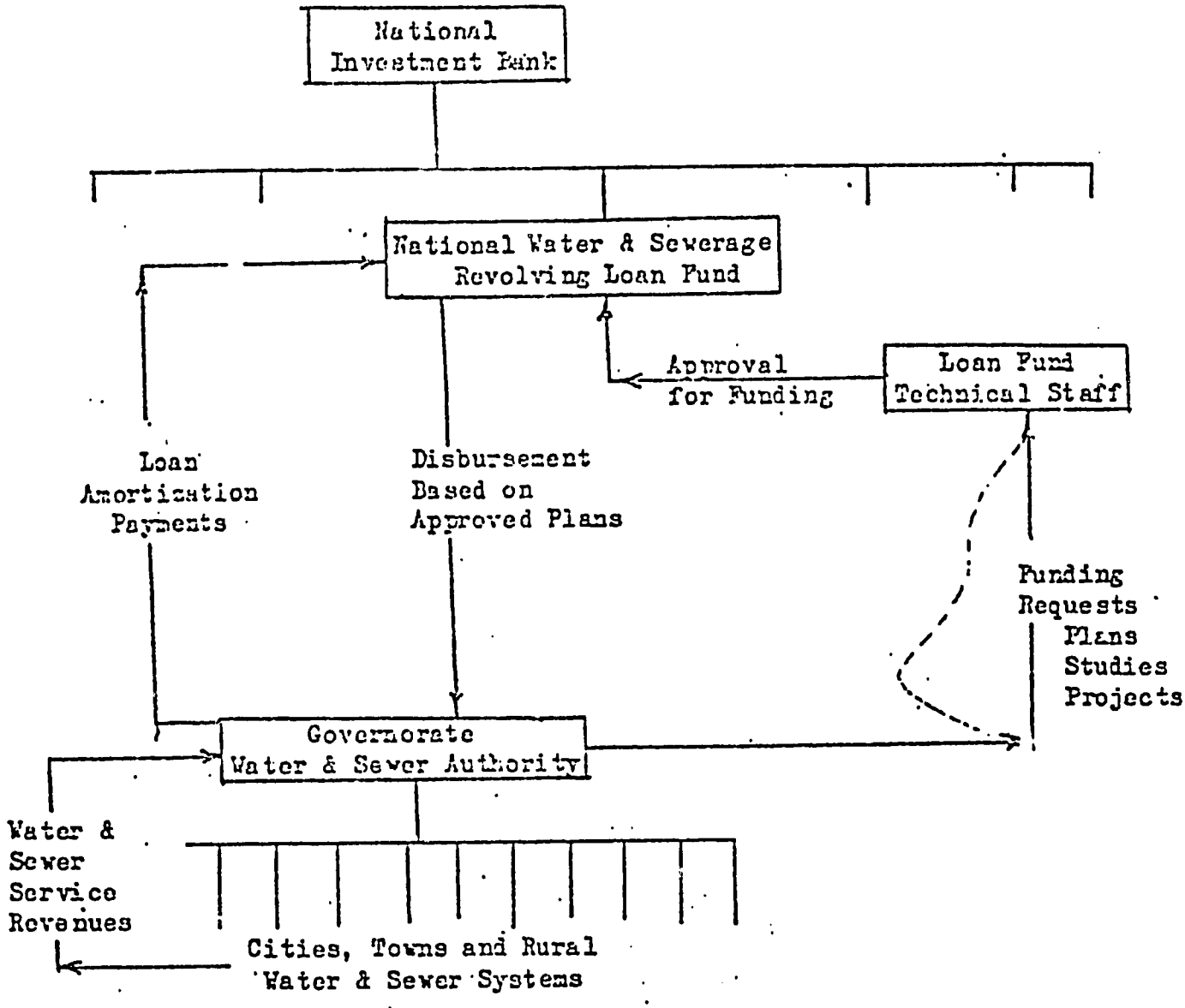


Fig. 3

National Water and Sewerage Development Program
Flow of Funds



ANNEX N

PEOPLE'S ASSEMBLY REPORT ON THE EGYPTIAN WASTEWATER PROBLEM

Arab Republic of Egypt
People's Assembly
Third Legislative Section
Fourth Ordinary Session

The Combined Committee of Housing, Infrastructure, and Local Government, Popular Organizations and Planning & Budgeting committees.

Dear Chairman of the People's Assembly:

I have the honor to present to you the report of the combined committee of Housing, Infrastructure and Reconstruction, and the two committees of Local Government, Popular Organizations and Planning & Budgeting about the report request addressed to the Prime Minister, Minister of Reconstruction, Minister of State for Housing and Land Reclamation, presented by Mr. Kamal El Din Mohamed Badawi; Mr. Omar Mohamed Attia; and Dr. Farkhanda Hassan, about the subject of the explosion of the discharge pipe in Ben el Sarayat station, the sewage flooding from the sanitary drainage network in the streets of Giza city and the water cut off from that city.

I request that this report be presented to the Assembly.

I have been selected as principal reporter and member of the Assembly, and Engineer Mohamed Hassan Dana has been selected as substitute reporter before the Assembly.

Best regards,

Eng. Moheb Ramzy Stino
Chairman of the Combined
Committee

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Report of the Combined Committee of Housing, Infrastructure, Reconstruction, and the two offices of Local Government, Popular Organizations, and Planning & Budgeting.

Concerning the subject of the report request addressed to the Prime Minister, Minister of Reconstruction and Minister of State for Housing and Land Reclamation, by Mr. Kamal El Din Mohamed Badawi, Mr. Omar Mohamed Attia and Dr. Farkhanda Hassan, about the explosion of the discharge pipe in Ben el Sarayat Station, the sewage flooding in the sanitary drainage network in the streets of Giza city, and the water supply cut off; the proposals of members who submitted the report request, and the government response.

The Assembly in its session of December 11, 1982 has referred the report request presented by Mr. Kamal El Din Mohamed Badawi, Mr. Omar Mohamed Attia and Dr. Farkhanda Hassan, about the subject of the explosion of the main discharge pipe in Ben el Sarayat station; the sewage flooding from the sanitary drainage network in the streets of Giza city, the water supply cut off; proposals of members presenting the report request and the government response, were referred to the Combined Committee and the two offices of Local Government, Popular Organizations and Planning and Budgeting to study and further submit their report to the Assembly.

The Committee has held four meetings for that purpose; two on the 14th and 15th of December 1982, chaired by Mr. Fathi el Rafei, Deputy Chairman of the Committee; and two meetings on the 8th and 13th of January 1983 chaired by Engineer Moheb Ramzy Stino, Chairman of the Combined Committee.

The two meetings of the 14th and 15th of December 1982 were attended by Mr. Adly Abdel Shehid, Deputy Chairman, and Mr. Kamal El Din Mohamed Badawi, secretary.

Representatives from the Local Government and Popular Organizations were Mr. Mokhtar Othman Abou Bakr, Deputy Chairman, and Mr. Youssef El Sayed Rakha, secretary.

Representatives from the Committee of Planning & Budgeting were Mr. Mohamed Nabil Abou El Seoud, Mr. Mahmoud El Sayed Abdel Rahman, Deputy Chairmen of the Committee; and Mr. Youssef Mohamed Sedeek, secretary.

Other attendees of the meetings were Engineer Attallah Safwat, Chairman of the General Organization for Sanitary Drainage Utility in Greater Cairo; Engineer Hussein Talaat Eid, Chairman of the General Organization for Water Supply Utility in Greater Cairo; and Mr Mostafa Bakr Ghazi, Director General of Legal Affairs in the Ministry of Reconstruction, all were representatives of the Government.

In light of the discussions held in those two meetings, the Committee has decided to make a field visit to the main sanitary drainage station of Ben el Sarayat in Giza Governorate to check on its status.

On December 19, 1982, the Committee members made their field visit to the station and monitored the work there, witnessed what has already been achieved. They were met by Dr. Abdel Hamid Hassan, Governor of Giza, Mr. Abdel Raouf Abou Hemila, Chairman of the Local Popular Assembly in Giza Governorate; Engineer Attallah Safwat, Chairman of the General Organization for Sanitary Drainage in Greater Cairo, Engineer Abdel Moneim Mohamed Ashmawi, Advisor for Sanitary Drainage Affairs, and other members of the People's Assembly for Giza Governorate; Engineer Hussein Othman President of Arab Contractors Co., Mr. Abbas Safei El Din, Vice President of Arab Contractors.

On January 8, 1983, a meeting was held to continue discussions of the report requests in light of the field visit. The meeting was chaired by Engineer Moheb Ramzy Stino, Chairman of the Committee and Mr. Fathi Lotfi Refai and Mr. Adly Abdel Shehid, Deputy Chairmen; and Mr. Kamal El Din Mohamed Badawi, secretary.

Members from the Local Government and Popular Organizations were Mr. Mokhtar Othman Abou Bakr, and Mr. Hussein Ibrahim El Mahdy, Deputy Chairmen of the Committee; and Mr. Youssef El Sayed Rakha, secretary.

Members from Planning & Budgeting Committee were Mr. Mahmoud Mohamed El Sayed Abdel Rahman, Deputy Chairman, and Mr. Youssef Sedeek, secretary.

This meeting was attended also by Engineer Hassab Allah el Kafrawi, Minister of State for Housing and Land Reclamation; Engineer Salah El Din Mohamed Fahmy, Director of Housing Dept. Ministry of Reconstruction; Engineer Mohamed Mohey El Din El Naggar, Director & Supervisor of Planning & Follow up in the Ministry of Reconstruction; Mr. Talaat Mohamed Hussein, Secretary General, Giza Governorate; Engineer Hussein Talaat Safwat, Director, General Organization for Sanitary Drainage in Greater Cairo; Engineer Abdel Kader Mohamed Abdel Kader, Director, National Organization for Potable Water and Sanitary Drainage; Mr. Ali Fath Allah Hassan, Director, Central Dept. for Budgeting of Services Authorities at Ministry of Finance; Mr. Ali Youssri Ismail, Chief, Giza City; Mr. Taher El Asmar, Assistant Secretary General, Giza Governorate; Engineer Mohamed Abdel Moneim Ashmawi, Advisor for Sanitary Drainage Affairs in Ministry of Reconstruction; and Mr. Ahmed Riad Ali Fouad, Technical Staff in the Ministry of Finance Office for People's Assembly and Shura, as representatives from the Government.

On January 13, 1983, the Committee held a meeting to continue discussions and submit its recommendations on the subject of the report request. The meeting was chaired by Engineer Moheb Ramzy Stino, Chairman, and the following members: Mr. Fathi Lotfy El Refai, Mr. Adly Abdel Shehid, Deputy Chairmen; and Mr. Kamal El Din Mohamed Badawi, secretary.

Representative of Local Government and Popular Organization Committee was Mr. Mokhtar Othman Abou Bakr as secretary.

Representatives of Planning & Budgeting Committee were Mr. Mahmoud El Sayed Abdel Rahman, deputy chairman, Mr Youssef Mohamed Sedeek, secretary. The meeting was also attended by Dr. Abdel Hamid Hassan, Governor of Giza; Engineer Fathi Mostafa Abou El Ghar, Advisor of Cairo Governor for Engineering Affairs; Engineer Mohamed Mohey El Din El Naggar, Director of Supervisory Sector of Planning and Follow Up at the Ministry of Reconstruction; Mr. Taher El Asmar, Assistant Secretary General to the Governor of Giza; Mr. Ali Youssri Ismail, Chief of Giza City; Engineer Attallah Safwat, Director General, General Organization for Sanitary Drainage in Greater Cairo; Engineer Sayed Kamal Rasmy, Undersecretary of State for Planning; Engineer Hussein Talaat Eid, Director, General Organization for Water Utility in Greater Cairo; Mr. Ali Fath Allah Hassan, Director Central Dept. for Budgeting Services Organization in the Ministry of Finance; and Mr. Ahmed Abdel Aziz, Minister of Finance Office.

The Committee meetings were also attended by the presenters of the report request: Dr. Farkhanda Hassan, Mr. Kamal El Din Mohamed Badawi, and Mr. Omar Mohamed Attia.

The Committee siezed the opportunity of the study of the Sanitary Drainage in Giza Governorate, to further study the following:

1. Status of Sanitary Drainage in General at the national level in light of projects and their investment costs.

2. Sanitary drainage at the Greater Cairo level, especially that the sanitary drainage in Giza Governorate is considered as an integral part of Greater Cairo sanitary drainage projects.

3. Giza Sanitary Drainage Network - the subject of the report request.

4. Proposals submitted to the Assembly, and the Ministers response to them.

5. The Committee's recommendations in this respect.

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. Proposals submitted to the Assembly, and the Ministers response to them.

. The Committee's recommendations in this respect.

First: Sanitary Drainage in the Governorates (Except in Cairo & Alexandria)

The Committee has indicated the poor condition of the sanitary drainage at the national level, which could have very bad consequences, if no immediate action was taken to face the predicated dangers.

The Committee feels it is imperative to present the current situation of sanitary Drainage in the governorates in general to the dignified Assembly, together with the urgent measures that should be taken against this situation as follows:

A. Status of Sanitary Drainage in the Cities

1. Cities with Sanitary Drainage Systems:

The number of cities with sanitary drainage systems has reached 18 cities, they are: Tanta; Port Said; Damanhour; Zagazig; Fayoum; Suez; Mansoura; Mehalla El Kobra; Kafr El Zayat; Banha; Shebin El Kom; Damietta; Beni Suef; Assuit; Ras el Bar; Kafr el Sheikh; Ismailia and Menya.

Because of the expansion of constructions in these cities, the increase in population density and the inability to cover these cities' sewage needs, the sanitary drainage has become incapable of absorbing the increasing sewage in addition to expiration of its estimated life.

2. Cities with Incomplete Sanitary Drainage Projects:

Cities where work had begun years ago in sanitary drainage projects in some of the main cities, but were partially completed, although were previously planned to be completed during the 1st five year plan. These cities are: Aswan; Qena; Sohag; Luxor; Shubrakhet; Menouf; Kafr el Dawar; Samanoud; and El Mahmoudia.

The Committee has noted that the budget allocations in the five year plan 82/83-86/87 were insufficient to complete those projects The balance remaining from the five year plan was 53.520 million Egyptian pounds.

3. Cities with Projects under Preparation of Design:

Studies and designs have been initiated for sanitary drainage project in 11 cities, studies will be finalized during the 1st five year plan, and the execution of the projects will be in the second five year plan. The 11 cities are:

Qaliyub; Sebin el Qanater; Barrages; El Khanka; Toukh; Kafr Shukr; Kafr Saad; Ezbet el Borg; Abou el Matameer; Farescour; and El Fekria.

4. Cities requiring conversion to sanitary drainage systems:

These are cities that have lowering water seepage operations, and are required to be converted to sanitary drainage systems for the preservation of the public health and for the prevention of epidemic diseases. These cities are: Meet Ghamr; El Mattaria; Dessouk; Zefta; Belqas; El Senbellawin; El Manzala; Beala; Dakarnus; Talkha; Menia el Kamh; Sherbeen and Farascour.

It is worth mentioning that these cities were programmed in the five year plan, but were never earmarked in the budget.

5. Cities requiring extension of sanitary drainage services:

Cities with special characteristics with a population that exceeds 40 thousand people. These are 40 cities:
Abou Kebeer; Belbase; Fakkous; Bahteem; Kaha; Ashmoun; Baltime; Foah; El Daigamoon; Hosh Eissa; Rashid; Edko; El Hawamdia; Warrak el Arab; Warrak el Haddar; Nasser; Senores; Malawi; Samalut; Maghagha; Beni Mazar; Naga' Hamadi; Armant; Kom Ombo; El Dakhla; El Kharga; El Badrashin; Aga; El Kantara Shark; Tema; Manfalout; Abnoub; Akhmim; Gerga; Tahta; Moot; Marsa Matruh; El Kantara Gharb; El Arish; and Abou Homos.

It was found out that these cities were programmed in the five year plan, but were never earmarked in the budget.

6. Projects for New and Proposed Cities:

New Cities are: 10th of Ramadan; 15th of May; El Sadat; 6th of October; New Ameriah; Damietta city and port.

New cities under study: El Obour; Badr; El Amal; El Salhia; Beni Suef city extensions; Assuit, Aswan and Menya.

B. Investments of Potable Water and Sanitary Drainage In the Five Year Plan 82/83 - 86/87

Comparison by Sector Requirements

In Millions of LE

Sector	Sector Requirement			Allocated Budget in the Plan			
	Potable Water	Sanitary Drainage	Total	Potable Water	Sanitary Drainage	Invest. Expend.	Total
Ministry of Housing							
Nat'l Org. for Potable Water & Sanit. Drain.	1566.00	894.00	2460.00	284,40	278,00	-	662.40
Ministry of Reconstruction							
Executive Auth. for Sanit. Drain. Projects in Cairo	-	847.80	847.80	-	450.50	1.00	451.50
Central Org. for Reconstruction High Dam Lake Dev. Org.)	179.30	17.80	197.10	81.50	8.50	-	90.00
Total Min. of Reconstr.	179.30	865.60	1044.90	81.50	459.00	1.00	541.50
New Communities Auth.	140.00	74.10	214.10	107.2	52.8	-	160.00
Local Gov. Organizations							
Gen. Org. Sanit.Drain. in Cairo	-	390.70	390.70	-	274.8	1.00	275.80
Gen. Org. Sanit.Drain in Alexandria	-	820.00	820.00	-	216.4	1.00	217.40
Gen. Org. for Water Utility in Greater Cairo	468.00	-	468.00	283.2	-	1.00	284.20
Gen. Org. for Water Utility in Alexandria	325.00	-	325.00	221.7	-	1.00	222.70
Total Local Gov. Org.	793.00	1210.70	2003.70	504.90	491.20	4.00	100.100
Total Housing, Reconstruction & Local Gov't	2678.30	3044.40	5722.70	978.00	1381.00	5.00	2364.00
Total Other Sectors	-	---	-	-	-	-	499.1
Grand Total	2678.30	3044.40	5722.70	978.00	1381.00	5.00	2863.1

Including what has been obtained, and facilities and self support that could be obtained

C. The Committee's Findings

1. In reviewing the projects of the plans, the table shows that the new projects in the governorate cities (40) exceeding 40 thousand people have been excluded.

2. Also excluded were the cities that had lowering of water seepage operations and that are required to be converted to sanitary drainage systems, and they are 13 cities.

- The budget allocations for the completed works until June 30, 1982 in 61 cities have reached 211.770 million pounds. The investments programmed in the five year plan are 378 million pounds. The balance of funds to complete sanitary drainage projects in 36 cities for the years following 1987 are 465,287 million pounds. Thus the available budget is insufficient to complete projects in any of those 36 cities mentioned above.

Therefore, the Committee concluded that it is far better to finalize sewerage projects in half of these cities during the current five year plan, and complete the remaining cities during the second plan 87-92.

Second: Sanitary Drainage in Greater Cairo

1. Introduction:

The Sanitary Drainage Utility was established in 1914 to accommodate a daily sewage of 48 thousand cubic meters for a population of 960 thousand people. With the continuing increase in population in Cairo and the implicit discharges, the discharge has reached 520 thousand cubic meters daily in 1960. In order to cope with this increase, the utility of sanitary drainage was supported several times. However, the Collector and Sewage Pump stations could not handle the increase, thus the sewage flooding appeared in the streets of Cairo, reaching to the dangerous situation due to the following reasons:

1. The tremendous increase in population in Greater Cairo resulting from the rural/urban migration, the urban area being an attractive area for population to the extent that its utilities that were basically designed to cover the needs of a population of 2 million is now faced with this problem of handling the discharges of 10 million people, regardless of its life or condition.

2. Increase in the rate of consumption of potable water per person. The average consumption per person has reached 300 litres a day compared to 100 litres in the past, in addition to the industrial remnant water which has increased remarkably due to

the great number of factories established in Cairo during the past twenty years. This results in increase in water consumption and increase in the amount of acids and other damaging materials that affect the life of the pipes.

Also adding chloride to potable water has remarkably affected the steel sewerage pipes.

3. The main and subsidiary stations have become incapable of overload of sewage water , also the sewage pump collectors have grown old. Some of these collectors in Ain Shams and Ameria have been functioning since 1950, the main sewage pump station in the Fish Market and Nafak el Tawil and Kasr el Dobara, Sayeda Zenab and Kasr El Aini, were established in 1964. The station at Makhrag el Sahara in Giza was established in 1965, the main station in Kadari and Maadi were established in 1966, the great sewage pump station in Dewra & Giza have been operating since 1969.

4. The sewage pipes have passed their estimated life, and great many of them need to be changed, especially those that were made of steel and installed temporarily which were affected by the sewage.

5. The stations are functioning without substitute collectors, thus the sewage flooding occurs as soon as any of these collectors stops functioning due to the need for repair or to power failure.

6. Disposing of remnants and solid materials in the sewerage network, and the informal house connections, the throwing of sludge in sewerage wells by sewage contractors (products of house tanks in areas with no sewerage systems), the lack of maintenance of drainage pillars and drainage equipment and valves, the breaking of doors of control rooms. All these factors led to the worsening of the problem, blocking the pipes and sewage flooding in the streets.

7. Shortage in the skilled technical manpower of engineers and assistant engineers and skilled labourers who refused to work in the sanitary drainage utility.

Because of the reasons mentioned above, it was imperative for the nation to make necessary urgent plans to face this tremendous increase in discharges. So the policy was set on the basis of two plans. The first was an urgent plan to prevent the recurrence of the sewage flooding with its dangerous consequences on the public health; and the second, a five year plan to accomplish complete renewal of networks and stations.

The urgent plan was implemeted in the 100 day project which was carried out in 1965. That was a temporary relief to the sewage flooding occurrence until the execution of the latter plan of the general project of sewerage in Greater Cairo.

However this plan was not put into action because of the 1976 wars and again the 6th of October 1973 war. As soon as the conditions were settled after the wars, the nation has put its plans according to its set priorities. The first priority was to bring the three canal cities to their normal life by bringing the migrants back to their homes. Thereafter the plan of the general project for Greater Cairo was put into action.

2. General Project for Greater Cairo Sewerage:

1. Description of the General Project:

A study was done on an integrated project for Greater Cairo and Helwan sewerage, and a general plan was set up in collaboration with the American & British Consultants (AMBRIC) for Greater Cairo Project; and with the German Consultant (DORCH) for the Helwan Project. Detailed drawings for the general project of Helwan were prepared, and some of them were put into action. Detailed designs for all parts of Cairo projects are currently being prepared. They consist of the following components:

(A) Execution of the East Nile Project consisting of the main central subway and subsidiary subways, sewage pump stations, collectors and a big purifying station at the (Gabal el Asfar).

(B) Execution of the West Nile Project consisting of collectors for Embaba city, sewage pump stations and rising mains to cover Giza, and Embaba and to construct a big purifying station at Abou Rawash.

(C) Replacing and renewing the current utility constructions and improving their efficiency.

(D) Improving the drainage of the subsidiary networks.

Estimated Costs of the Project

Millions of LE

Project	Local	Foreign	Total
East Nile Project	348	354	702
West Nile Project	251	107	358
Replac. & Renew.Proj.	36	89	125
Improv. Subsid.Network	81	29	110
Total	716	579	1295

These estimates were based on January 1982 prices.

This project was to be carried out during two plans, the first five year plan 82/83-86/87 and the second only a three year plan 87/88-89/90 as follows:

(A) The First Five Year Plan(82/83-86/87)

Millions of LE

Project	Local	Foreign	Total
East Nile Project	271	283	554
West Nile Project	85	40	125
Replac.& Renew.Proj.	36	89	125
Improv. Subsid. Network	61	23	84
Total	453	435	888

(B) The Second Plan (87/88-89/90)

Millions of LE

Project	Local	Foreign	Total
East Nile Project	77	71	148
West Nile Project	166	67	233
Replac.& Renew.Proj.	-	-	-
Improv. Subsid. Network	20	6	26
Total	263	144	407

It was stated by the Committee that during the first five year plan 82/83-86/87 the following projects could be completed:

- Replacement and renewal project for Cairo Sanitary Drainage Utility.

- About 80% of improving the sewerage subsidiary network.

- 90% of the East Nile projects, except for the purifying operation in the Gabal el Asfar, only 65% of it will be completed

- 35% of the West Nile project.

It is anticipated that these projects will be completely finalized during the following three year plan 87/88-89/90.

(C) Foreign Component Funding Sources

The following table shows the foreign component funding sources for the general project of the Greater Cairo sewerage:

		Millions of LE
Funding Source	Foreign Currency	Equiv. in Local Cur
Grant from USAID	US$ 99.1	83.2
Grant from British Gov't	Sterling 52.1	50.7
British Loan- Facilitated Conditions	" 100.0	155.0
Loan-German Reconstruction Bank	Deutch Mark 9.5	3.5
Loan - Japan -Facil.Cond.	$53.0	44.5
		366.9

We note that the foreign currency required to complete the first phase of the project during the first five year plan 82/83-86/87 is estimated at 435 million Egyptian pounds, out of which 366.9 million pounds have already been obtained, about 84.3% of the funding. The remaining balance of the foreign currency funding required for the execution of the plan is 68.1 million pounds or 15.6%. This is to be provided either by grants, loans or from the national budget.

Second: Helwan Sewerage Project

A. The general project for Helwan Sewerage consists of the following components, all of which are to be completed during the five year plan 82/83-86/87:

1. The main and subsidiary sewerage networks in Maasara and Helwan.

2. Main Collector for sewerage along 35 kilometers from Maadi north to Tebeen south. It consists of 3 sewage pump stations and a main station for lifting sewage water to the purifying station.

3. A station to purity 350 thousand cubic meters of water per day, reaching up to 550 thousand cubic meters in the future.

4 A siphon across the Nile to drain irrigation water or purified water of drainage exceeding the need of the reclaimed lands, to be transferred to the sewerage system across the West bank of the River Nile.

5. Training the technical staff in the fields of operations and maintenance.

(B) Project Costs at 1981 Prices

Millions of LE

Project	Local	Foreign	Total
General Proj. for Helwan Sewerage	68.54	38.35	106.89

(C) Foreign Component Funding Sources

Concerning the foreign currency funding sources necessary for the project, an agreement has been reached with the following funding sources:

Grant from European Fund	LE 26.3 million pounds
Grant from Italian Gov't	3.2 million pounds
Loan by Gov't of Holland	3.4 million pounds
Total	32.9 million pounds

An amount of 5.4 million pounds of foreign currency component of the project remains to be obtained from other funding sources, preferably grants, if not feasible, then loans or it could be obtained from the national budget.

Third: Other Projects of the General Organization for Sanitary Drainage Utility

In addition to projects mentioned above, the General Organization for Sanitary Drainage Utility in Greater Cairo, and the Executive Board for Sanitary Drainage projects are designing and executing other projects, the most important are: Purifying station in Gabal El Asfar and Shubra El Kheima; and Widening the Belbase sewage collectors in Nasr City, and other projects in the pyramid area, where work has already been started and completion is underway. During the approved five year plan, the costs of these projects have reached 727.3 million pounds (275.8 from Cairo Utility and 451.5 from the Executive Board), not to mention what was included in the third list of funding investments with facilities, and additional special grants amounting to 351 million pounds.

The Committee has stated that additional facilities in foreign currency from the U.S. and Europe need to be obtained during the next five years.

2. Despite the indication of the Ministry of Planning, on pages 112 and 113 Section 1 of the detailed Framework of Plan that the local currency needs were designed to match the loans and grants, yet by going back to the plan and its detailed items it becomes clear that the local currency component, even with the available loans and grants is 50 million pounds less than what is required for Greater Cairo Sewerage projects.

3. In discussions with the concerned parties, it was obvious that the sanitary drainage projects in South of Cairo, East of the Nile (between Old Cairo and Maadi) will not be completed in the first five year plan, and that after the year 1987 the sewerage will be pumped in Giza. Therefore, the Committee considers either modifying the project, or suspending all construction projects of housing or industrial units East of the Nile South of Old Cairo.

Third: Sanitary Drainage in Giza Governorate

(A) Details of the Situation

1. Giza main sewerage station (Old Pump Station)

- In 1936, the old station was established with capacity of 4 diesel engines.

- In 1965, a new pump station was established to cover the construction expansion and the old pumping station was insufficient to pump the incoming sewage. That was a part of the 100 days project.

2. New Sewerage Station in Ben El Sarayat

- In October 1979 a new station was established with a capacity of 9 electric pumping collectors.

- In 1972 only two collectors were functioning in addition to the continuous use of the old station.

- At present, 6 units are being utilized, each unit pumps 1200 litres per second, meaning that the amount of pumping in case of using the 6 units under ordinary circumstances, is 7200 litres per second, or 7.2 cubic meters per second. Therefore, if, for any emergencies like power failure for 5 or ten minutes a station stopped operating, the water will overflow in the streets as sewage flooding as a result of that failure.

- The station was consolidated with three different sources of electric power (2 continusously working, the third stand by).

- This station transfers the sewage water to the sewage treatment plant in Zenein where the liquid is dumped into the Muheit Drain and the solid is thrown into Abou Rawash plantation.

- Pumping from Ben el Sarayat station to Zenein station is accomplished through two drain steel pipes, the diameter of each is 1500 mm.

- Establishing a new line connecting Giza station to Zenein station, 3.5 km. long and with a diameter of 1500 mm. to substitute the old existing lines that had passed their estimated life and were fading away, resulting in the sewage flooding and breaking of the pipe in Sudan street, again leading to water overflow in the station exposing the electric units and the station itself to great danger.

3. Reasons for Failure of the Station:

1. The station was overloaded. It was designed to handle 400 thousand cubic meters of sewage water daily, whereas it is presently overloaded with the Giza flows, with all its expansions, in addition to the drainage of South of Cairo regions exceeding 200 thousand cubic meters daily. Thus the sewage waters reaching the station far exceeded its capacity.

2. The old pumping station is over 30 years old, and it pumps water from another subsidiary line to assist the station in absorbing the sewage water.

3. The main reason for the inefficiency of the station was that the main drainage pipe was cracked(behind the station in Sudan street). The station was established in 1965 and was initially designed to be used for only a period of 7-10 years maximum. 11 years have passed over its estimated life.

4. Widening of the crack in the pipe led to the gradual inefficiency of the station and the recurrence of the sewage flooding in the lower areas like Agouza, Dessouk Street, Tanta Street, Tosson Street, Falouga, Madinet el Aalam, Madinet el Sohafein, Safa City and other streets.

4. Measures taken prior to the development of the latest events of the 1st and 28th of November 1982

A survey was done by Giza Governorate on the problems of sanitary drainage in Giza city with its three districts, concentrating on the main Giza station, sanitary drainage lines and Ben el Sarayat station,

- The workshops of El Beheira Co. and Arab Contractors Co. took over the task of manufacturing all pipes, joings and other equipment required for repair.

- The use of divers from Suez Canal Authority to assist in welding and connecting pipes to the network.

- The use of the broad expertise of Engineer Abdel Moneim El Ashmawi, the ex Director of National Organization for Potable Water and Sanitary Drainage, and Advisor at the Ministry of Reconstruction, who designed the plan for repairing the station and supervised its execution.

- The contribution of firemen in transporting water to the Giza bakeries during the periods of water cut off. Also the Army vehicles contributed in transporting bread to be distributed regularly to people as on normal days. The number of trucks and vehicles reached to 40 water tanks.

- Securing the power current by operating the control station and providing wireless for communications. The engineers were working for 3 shifts, the diesel station for power generation was operating to feed the station and secure additional generators outside the station as a guarantee for its proper operation.

- Completion of the main subsidiary line of 1500 mm. at a distance of 150 meters by the Egyptian Contractor Co.(Ex. Mokhtar Ibrahim). The plan was originally estimated to be completed in 3 months, whereas it was actually completed in 5 days.

-Repairing the main pipe behind the station by the Arab Contractors Company.

- Providing a complete set of suction pumps to drain the water from the streets where the sewage flooding occurred. The Armed Forces provided 20 medium pumps and 6 big pumps and 5 suction cars.

- The pipe was connected under the railway station subway. The collector pipe was installed inside the old station.

- The new pipe was connected to the collector pipe inside the station.

- A complete collective line was established inside the station-connecting all existing units.

7. Completion of Required Repairs:

Before noon on Thursday December 16, 1982 the miracle happened and the difficult task was accomplished. The old pipes were changed and new ones installed according to the time schedule in a time record (10 days). The work of 4 months was accomplish in those 10 days, in addition to draining all the waters from th streets of the station, repaving the roads, mending the bumps, fixing the general lights and removing all remnants from the station area.

8. Continuing the Execution of Technical Works:

In addition to what has already been repaired, the rest of the technical works is currently being executed:

- Repairing and renewing the 3rd line of the rising mains (old) to the station in a maximum period of 10 days.

- Checking the 30 inch diameter pipe (900 mm,) and fixing any defects in it and connecting it with the new line of 1500 mm.

- Establishing an underground for all the existing and future pipes to pass through.

- Repairing and renewing the station internally.

- Replacing the Rising Mains from the Dowra station to the Nile Siphon in Manial.

- Establishing a new dactile cast iron line to provide two permanent lines.

The Committee wishes to point out that the Prime Minister has agreed to provide the governorate with half a million pounds to repave the streets that were damaged by the sewage flooding.

- The cost of what was accomplished in this very short time exceeds one million pounds.

Fourth: Proposals Submitted by Members and Their responses

The Committee has reviewed the proposals submitted by members who presented the report requests, and the Minister of Reconstruction has answered them before the Committee. The recommendations included the Committee response to those proposals as follows:

- Providing all necessary potentials and funds for solving the problem of sanitary drainage.

Answer: The necessary funds have been allocated for sanitary drainage projects at the level of Greater Cairo for sical years 82/83. Selected companies have been given job assignments to start replacing steel pipes with dactile cast iron, and replacing necessary raw materials during the next months and effective with July 1, 1983 we will start the execution phase of the major stations.

- Periodic field visits to the sanitary drainage station in Ben el Sarayat area to fully comprehend the real magnitude of the problem.

Answer: The Committee has made a field visit to the sanitary drainage in Gize on December 19, 1982. Results of that visit are included in this report.

- Follow up on work and measures to be taken to remedy the existing situation and bring back Giza governorate to normal life.

Answer: One of the two steel lines is being replaced by dactile cast iron, a third one (new) made of cast iron will be installed to helf achieve full efficiency of the station. The Egyptian Contracting Co. is currently changing the subsidiary pipes and the internal renewal will be completed during the next three months. The station has been operating efficiently since December 12, 1982.

- Replacing and renewing plan, and the sanitary drainage alternatives at the level of Greater Cairo and with a time schedule.

Answer: Job assignments have been given to the selected companies with a time schedule for completion.

- Allocating an independent budget for Giza Governorate for sanitary drainage and potable water projects, separate from the general budget.

Answer: Giza governorate could have an independent budget but only for maintenance works. Each governorate will be allocated an independent budget for maintenance.

- Providing Giza governorate and its local councils with maps showing all sanitary drainage networks and potable water networks, with details of kinds of lines and equipment, the estimated life of each, so that these documents could be kept under supervision and control by the governorate officials.

Answer: Lately the governorate had been provided with maps and drawings and all details. It is intended to provide Giza governorate with other copies of maps and drawings of all networks including all new available information to assist in supervision and follow up.

- Compensating Giza city by Cairo Governorate, for repaving all streets damaged by the sewage flooding.

Answer: Half a million pounds from the local budget have been allocated to repave the streets of Giza city.

- Charging a fee to be paid by Cairo governorate, for passing of sanitary drainage water coming from Cairo to Giza- to allow Giza governorate to protect its citizens from the dangers and risks of drainage water by taking more protective measures and make available suction equipment and cover all uncovered drains.

Answer: It is not legitimate to charge fees for water passing, but fees could be charged for beneficiaries of sanitary drainage services.

- Establishing a Ministry of Utilities, under which falls the drainage and potable water utilities in Cairo, and the National Organization for Potable Water and Sanitary Drainage; and other organizations.

Answer: If this suggestion implies negligence from the part of the Ministry of Housing, it is worth mentioning that achievements of the Ministry of Housing in all fields including the Utilities in the past two years, have exceeded what has been achieved in the past twenty years. This could be supported by figures. The annual average of investment for the years 60/61 until June 20, 1980 (20 years) was 31.96 million pounds, whereas the annual average of investment in 80/81-81/82 (2 years) has reached 263.29 million pounds - a percentage of 823.8%.

Fifth: The Committee's Recommendations

1. First: Financial Recommendations

To execute the new projects currently under study after approval of the Ministry of Planning, funded by grants and facilities from foreign countries (apart from what was included in the third list of investments supplied by additional grants and special facilities), provided that sanitary drainage projects in Giza are given highest priority.

2. Providing the necessary local component of funding, equivalent to facilities that could be obtained in the future.

Second: Legislative Recommendations

3. Passing a law to make a cordon around Greater Cairo in order to stop construction expansion and factory constructions inside this cordon of Greater Cairo, on the other hand, encouraging constructions of housing and factories in the new communities.

4. Expedite passing a legislation concerning the new pay scales for sanitary drainage utility employees, which was referred to the Manpower authority for further study and review.

5. Consider charging fees for sanitary drainage services, in order to improve the utilities- like increasing the tarriff on water consumption based on ascending samples, provided that a Utility Fund would be established to deposit excess income, resulting from over consumption. These monies could be spent on the proper maintenance of utilities.

Third: Organizational Recommendations

6. Reorganize the Sanitary Drainage and Water sectors to provide independence and flexibility to allow for better administration under the supervision of the Ministry of Housing.

7. Provide and allow for incentives to workers, in order to encourage them to join the utilities Sectors, considering that a great number of engineers and technicians have refused to work in the utilities sector.

8. Make use of the expertise of engineers and technicians over the age of 60, by hiring them as consultants to supervise the technical execution of the projects.

9. Train workers in sanitary drainage field on methods of maintenance and modern mechanization.

10. Provide necessary raw materials for the execution of the required projects, expand, improve and support factories producing constructions materials and pipes of different diameters.

11. Aware the public on rationalization of utility components by not throwing solid materials in the sewerage networks, thus damaging the network, also applying the law against the informal house connections by some contractors.

12. Supervise the manufacture of sanitary utensils, faucets and valves according to specifications, and attempt to teach manufacturers how to apply modern technologies in this field.

Fourth: Recommendations on Sanitary Drainage in Giza (Subject of Report Request).

13. Pay generous awards to employees who contributed to solve the sanitary drainage problem in Giza, in appreciation to their heroic deeds and to set a good example for other governorates.

14. Giza governorate will be independent from Cairo governorate in maintenance sector. To provide Giza governorate with different equipment and necessary maintenance facilities.

15. Follow up on operations in Ben el Sarayat and other stations, hold periodic meetings with concerned personnel to follow up on the work and avoid any recurrence of sewage flooding.

16. Cover the Zenein drain passing through the residential area in Teret el Zomor St. to Zenein station as a protective measure of public health of the citizens.

17. Ensure complete coordination between sanitary drainage, water and electricity, and sewerage and irrigation authorities.

18. Compensate families whose homes were covered with sewage flooding, by paying them sums of money - to be equal to the victims of the heavy rain falls in Upper Egypt.

19. Authorize exceptional pensions for the five workers who lost their lives during the execution of work on the broken pipe in Giza.

20. Immediately stop construction and industrial expansion in the area between Old Cairo and South of Maadi - those areas that drain waters in Giza, for a period of time until the completion of the sewerage projects in this area - by 1990.

At the end of the report, the Committee would like to emphasize the measures taken to face the problem of sanitary drainage in Giza - in fact it was a miraculous achievement, with heroic deeds of patriotism that were praised by many people. The Committee would like to extend its appreciation and thanks to the residents of Giza who patiently cooperated and assisted in the achievement of the repair in a time record. Also thanks to Engineer Hassab Allah el Kafrawi, Minister of Reconstruction, and Minister of State for Housing and Land Reclamation, who personally headed to the site at the time of the accident supervising the repair work day and night. Also thanks to Dr. Abdel Hamid Hassan, Governor of Giza, who was the leader of the national battle that was finally crowned with victory.

Appreciation is extended also to Abdel Halim Abou Ghazala, Deputy Prime Minister and Minister of Defence and General Commandor of the Armed forces for providing all facilities and equipment. The Arab Contractors Co. the Egyptian Contractors Company the Beheira Co. are also appreciated for all the help in providing facilities, equipment and modern tools; also the expertise of the Suez Canal Authority personnel and divers, all the executive board of the popular and political units for all the efforts exerted to accomplish all repairs on a time record, working day and night to save the city of Giza from a real flooding, had it not been for God's mercy.

The Committee presenting the report, recommends the Assembly to approve the report and the recommendations attached therein.

Eng. Moheb Ramzy Stino
Chairman of the Combined Committee

ANNEX O

THE SEWER PROBLEM: A FIRST-HAND VIEW

DATE: January 31, 1983 O-1

UNITED STATES GOVERNME

REPLY TO ATTN OF: DPPE/PAAD, Richard Fraenkel

memorandur

SUBJECT: The Sewer Problem: A First-hand View

TO: THE FILES

This evening I accepted the offer by my driver, Salah Fakheer, to view the sewer problem at first-hand by visiting his home (Shara Meshrouh, Mit Eqba, Hara Saquiah, Qism Agouza). Salah introduced me to the residents of 5-6 ground floor apartments on his street which have been invaded periodically by sewer water. Salah himself lives upstairs and therefore has been less directly affected. One old woman, originally from Fayoum, almost in tears, described how the sewer water filled her three, small rooms the night before last. It enters through two places: the latrine, and the sewer basin which serves all seven apartments in the building. The apartment is continuously damp and smelly, to which she attributes her illness. The children too are sick. One has been to see the doctor twice this week. The private trucks which remove sewage do not come regularly. Salah attributed this to the inability to pay of the residents. While some can afford to pay from 50 piasters to 1 LE per removal, many others cannot. Further, the people in many first floor apartments have built small, cement dikes in front of their entryways to keep the sewer water outside from entering. This creates a maze of obstacles in the street, and the trucks can no longer enter the street.

This street of buildings is about 12 years old. The sewer problem started here about six years ago. The main streets of Agouza were fixed by the municipality when they overflowed with sewage last month. But no attention is given by the authorities to conditions in back streets such as this, according to Salah. The residents of the street are unorganized. No neighborhood or municipal level organization is currently addressing the sewer problem. But Salah felt that it would be possible for him and his neighbors to organize to fix the sewer pipe on their street. He volunteered that most everyone could contribute 10-20 LE. However, he admitted that he knew of no current successful self-help efforts in Agouza. He also said that because the main drain at the end of the street was also malfunctioning, there would have to be governmental efforts along with the self-help, voluntary actions.

None of Salah's neigobors was ashamed to show me the sewer problem as it existed inside of their own homes. Each of them showed me how he or she (some of the men were praying in the local mosque at the time) had built up the latrines and door sills to prevent the

sewer water from overflowing the apartments. I was surprised by the prosperity of the people in the neighborhood. They were well-dressed and appeared to be well-fed. Many automobiles are parked at the end of the street. Some of the apartment buildings have attractive, marble lobbies. Everyone on the street rents his apartment. Rents are much lower in the areas of Agouza which suffer from the sewer problem. They range from 4-15 LE/month, whereas elsewhere they are typically 40 or 50/LE month for comparable units.

Salah, because he lives upstairs, is far less affected by the sewer problem than his ground floor neighbors. But he is afraid of contagious disease, gets muddy every time he comes and goes from the apartment, and he says that the structure of the entire apartment building is being weakened by the constant flooding of the foundations so it may fall down. Basically, he, like his neighbors, is waiting for some outside intervention to solve this crucial problem affecting him and his neighbors.

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DD:OCylke
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AD/DRPS:GZarr

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