AGENCY FOR INTERNATIONAL DEVELOPMENT

Washington, D. C. 20523

PROJECT PAPER

EGYPT: Cairo Water Supply II
(263-0193)

September 25, 1988

Cairo Water Supply II
Project (263-0193)

Department of State
Agency for International Development
Washington D. C. 20523

Project Paper

Egypt: Cairo Water Supply II

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: Egypt

3. PROJECT NUMBER: 263-0193

4. BUREAU/OFFICE: ANE — 03

5. PROJECT TITLE (maximum 40 characters): Cairo Water Supply II

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 12 DD 31 YY 93

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 88 — B. Quarter 4 — C. Final FY 93

8. COSTS ($000 OR EQUIVALENT $1 = 2.76)

A. FUNDING SOURCE	FIRST FY B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total						
(Grant)	(96,000)	(- 0 -)	(96,000)	(97,900)	(6,100)	(104,000
(Loan)	( )	( )	( )	( )	(31,600)	(31,600
Other U.S. 1.						
Other U.S. 2.						
Host Country						
Other Donor(s)						
TOTALS						$135,600

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ESP	729	729		- 0 -		96,000		104,000	
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 826 | 541 | 700

11. SECONDARY PURPOSE CO: 720

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)
A. Code
B. Amount

13. PROJECT PURPOSE (maximum 480 characters)

(a) rehabilitate and expand the Cairo central city water transmission and distribution facilities; and (b) strengthen GOGCWS institutional capacity to operate and maintain the entire Cairo water supply system.

14. SCHEDULED EVALUATIONS
Interim MM 09 YY 90 — MM 08 YY 93 — Final MM 08 YY 93

15. SOURCE/ORIGIN OF GOODS AND SERVICES
☒ 000 ☐ 941 ☒ Local ☐ Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment.)

USAID/Egypt controller concurs with this proposed methods of implementation and financing.

9/20/91

17. APPROVED BY
Signature
Title: Director USAID/Cairo
Date Signed: MM 09 DD 25 YY 88

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
MM DD YY

ABBREVIATIONS AND ACRONYMS

Organizations

AID	Agency for International Development
AMBRIC	American British Consultants
ATK	A.T. Kearny
BVI	Black and Veatch International
ES-P	ES-Parsons
GOE	Government of Egypt
GOGCWS	General Organization for Greater Cairo Water Supply
GOSD	General Organization for Sanitary Drainage
JMM	James M. Montgomery, Consulting Engineers, Inc.
MIC	Ministry of International Cooperation
MOU	Memorandum of Understanding

Technical

m^3	cubic meter
m^3/d	cubic meters per day
hr	hour
km	kilometer
l/d	liters per day
l/m	liters per minute
m	meter
mm	millimeter
km^2	square kilometer

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PROJECT SUMMARY AND RECOMMENDATION

Summary Project Description

Project Rationale: The need for an adequate and reliable supply of potable water for densely populated Central Cairo prompted AID to finance the expansion of the Rod El Farag Water Treatment Plant under Project 263-0038, Cairo Water Supply. However, because of serious deficiencies in the hydraulic capacity of the water distribution network, the water treatment plant only operate at 3/4 of its capacity. In addition to basic water quantity shortfalls, there exist serious problems in regulating water quality and in the management of basic services within the responsible water authority, the General Organization for Greater Cairo Water Supply (GOGCWS).

Project Goal and Purpose: The goal of the project is to improve sanitation and health conditions for the twelve to fourteen million people living and/or working in the greater Cairo area. The project's purposes are to: (a) rehabilitate and expand the central city water transmission and distribution facilities and (b) strengthen GOGCWS institutional capacity to operate and maintain the entire Cairo water supply system.

End of Project Status: Two million Cairo residents and three million day workers will be the direct beneficiaries of improvements to the water distribution and transmission systems serving the central portion of the city. Twelve to fourteen million residents will be the beneficiaries of improvements to the GOGCWS, the water utility which serves Greater Cairo.

Project Elements: The Project has two major components -- Infrastructural Development and Institutional Development.

The Infrastructural Development component will include the following:

- Installation and/or Rehabilitation of approximately 20 Kilometers of New Transmission Pipelines
- Installation of about 33 Kilometers of Distribution Pipelines
- Erection of Five New Storage Reservoirs
- Facility-specific "Hands-On" Training for New Equipment and Facilities

The Institutional Development component will provide organizational and technical systems support to the water authority in the following areas:

- o Manpower Development and Training
- o Establishing a "Twinning" Exchange Arrangement with a U.S. Water Utility
- o Purchasing and Inventory Management
- o Generic Systems Improvements
- o Modernizing of Accounting and Financial Systems
- o Upgrading Maintenance Facilities and Equipment
- o Establishing a Central Laboratory

Host Country Contributions

The Government of Egypt (GOE) cash contributions are LE 64.8 million ($23.5 million), including LE 26.4 million in land acquisition. It is estimated that GOE "in-kind" contributions to the project amount to LE 20 million. In addition, it is envisioned that LE 2.5 million of Special Account funds will be used to establish a revolving fund for loans to homeowners for the purpose of financing connections to both the public sewers and the public water mains.

Cost Estimates

Amounts in the following table are millions of U.S. Dollars

PROJECT INPUTS	USAID		GOE		TOTALS
	FX	LC	LC	"IN-KIND"	
Network Upgrading	62.9	0.5	22.4	3.0	88.8
Institutional Development	29.8	5.3	--	4.2	39.3
Project Contingency	4.9	0.3	1.1	--	6.3
Audit & Evaluation	0.3	--	--	--	0.3
Revolving Fund	--	--	0.9	--	0.9
TOTALS	97.9	6.1	24.4	7.2	135.6

Project Assistance Completion Date

A Project Assistance Completion Date of 31 December 1993 is proposed.

Financial Plan

AID grant funds will finance the foreign exchange costs for the two construction contracts and both foreign exchange and local currency costs for the construction management/engineering services contract and the institutional development/technical assistance contract. The GOE will acquire the land and finance all local currency costs affiliated with the two construction contracts.

Implementation Plan

The General Organization for the Greater Cairo Water Supply (GOGCWS) will be the GOE Agency responsible for the implementation of this project. This agency implemented the Cairo Water Supply I Project (263-0038) and has demonstrated their capability to implement water supply projects.

The Cairo Water Supply II Project follows and expands on the first phase project (263-0038) which rehabilitated the Rod El Farag water treatment plant and provided management consulting services. As part of this first project an American A&E consulting firm (CH2M-Hill) was competitively selected to conduct the engineering studies and is preparing the tender documents for upgrading and expanding water service in the Rod el Farag area.

Three host country contracts and one A.I.D. direct contract with U.S. firms will be used to implement the Project. Two construction contracts (pipelines and structures) and two technical assistance contracts (construction management and institutional development) are proposed.

Monitoring and Evaluation

USAID and GOGCWS will monitor work of the institutional development contractor, twinning institution, and engineering consultant via voucher inspection, project meetings, and monthly progress reports. The engineering consultant will provide routine supervision to the two construction contractors. A evaluation of the present engineering consultant's performance will be conducted in early 1989 to determine whether to utilize this firm for the construction management services under this project. The impact of the institutional development contractor's work will be monitored through performance monitoring systems developed for each activity. Progress towards the project's goal and purpose will be monitored by semi-annual reports on key indicators identified in the Log Frame supplemented by special studies. The project will fund an interim and final evaluations.

Analyses

A number of analyses were conducted to ensure that the Project will be technically, economically, financially, administratively, environmentally, and socially sound.

Technical: Evaluation of the various alternative actions for improving service in the Rod El Farag service area indicates that no one alternative can effectively improve service, rather a balanced program is necessary which includes an increase in system operating pressure, a reduction in water consumption, improvements in the pipe network, and additional storage facilities. In addition, complementary institutional improvements are recommended to ensure that maximum benefits are derived from the physical improvements to the infrastructure completed under the first project and proposed under this Project.

Economic:

The Institutional Development component of the Project was examined using a discounted payback approach with constant 1987 dollars. The analysis demonstrated that the investment would pay for itself within a 14-year period for a targeted increase in efficiency of 10%.

The loss of water through waste was singled out for separate examination as part of the economic analysis due to its importance. Water waste accounts for 40-50% of losses in production. The Project will initially allocate approximately $1.1 million specifically for the water waste reduction element. Based on this investment, the payback period on a reduction from 50% to 48% wastage would be 70 days. Obviously, the rate of return is extraodinarily high. The water wastage program is experimental but will be expanded if preliminary results are positive.

Technical assistance and equipment totaling $34 million will be used to improve GOGCWS's efficiency. GOGCWS's oparation and maintenance budget is about $40 million per year. Assuming that training, automated financial and bill collecting and improved inventory systems will increase organizational efficiency by a moderate 10%, the payback on the instititional investment would be 12 years.

Benefits from water projects, particularly those related to health, are recognized as difficult to measure, however, significant correlation between lowering enteric disease incidence and piped water service has been made by the World Health Organization. Lower disease incidence is particularly verifiable in those areas where the percentage of residences having piped water reaches 70%. Other difficult to measure benefits will be improved quality of life, reduced pumping costs to owners, and improved property values.

The economics of the infrastructure upgrading component is based on a cost - effectiveness analysis currently being reviwed by the design consultant. Recurrent costs for operation and maitenance of the infrastructure has been calculated to be 1.5 - 2.0% of the investment, an amount which will be covered by an expected 10% reduction in leakage and lower system maintenance.

Financial:

Data provided by GOGCWS indicate that 62% of the O&M costs were covered by tariffs in 1987. This ratio corresponds with the target computed for 1987 and is consistent with the GOE/USAID January 1984 Memorandum of Understanding. The most recent projection by an AID consultant is that GOGCWS is meeting 100% - 114% of the 1990 targets after the Jan. 1988 tariff increase. Disparities exist in estimates of O&M coverage because of difficulties from the presently outdated accounting procedures and the treatment of uncollectible bills. Unfortunately, the MOU is not specific with regard to how cost coverage should be calculated.

Institutional and Administrative:

Throughout the implementation of the first Project (Cairo Water Supply I), GOGCWS has performed well in the review of project documents, the approval and award of contracts, and the overall management of contractors. In our opinion, GOGCWS supported by an engineering consultant has the contracting capability to satisfactorily procure and manage the construction services needed for implementation of the Cairo Water Supply II Project.

A number of institutional weaknesses have been noted in GOGCWS with regard to the long-term operation and maintenance of the facilities provided under both the first project and this Project. The Institutional Development Component of this Project addresses those weaknesses.

Environmental:

The major environmental concern regarding the Project will be the change in water usage patterns in the water services area and the resulting impact of increased water usage on wastewater facilities. A secondary concern is the potential for increasing the already high wastage and leakage losses as system pressures are increased.

An Environmental Assessment will be prepared in accordance with the provisions of 22 CFR 216, "AID Environmental Procedures" by the present engineering consultant.

Social:

"More water" will have many benefits to the citizens of Cairo, not the least of which is reduction in the potential for the transmission of waterborne diseases. The availability of water for servicing public areas will greatly enhance the few open spaces in central Cairo and thus benefit commerce as well as the inhabitants. New tariffs, a new metering policy, and the extension of the service area to the poorer districts of the Rod El Farag service area, will introduce a safe supply of water to a greater number of citizens.

Recommendations

The Project Committee recommends that an Economic Support Fund (ESF) grant of $104.0 million be authorized for the Cairo Water Supply II Project (263-0193). This five-year project should be incrementally funded as follows:

FY 88:	$96.0 million
FY 89:	$ 8.0 million

Project Committee

The following AID personnel participated in the preparation of this Project Paper:

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1.0 PROJECT BACKGROUND AND RATIONALE

1.1 Introduction

Cairo, Egypt's largest city and the center of the nation's trade, industry and political activity, has suffered from the effects of an inadequate water supply system for many years. Due to poor maintenance, failures in the system are frequent and losses from leakage are excessive. Much of the present system was designed to handle less than one-half of the current water demand. Despite adequate levels of water production, water shortages exist in many areas of the city due to deficiencies in the distribution system. Areas of rapid urbanization, particularly on the growing peripheries of Cairo, have developed far ahead of the ability of service facilities to catch up. The Rod El Farag area, for which this project is being proposed, has one of the fastest growing populations in Egypt. Poor water pressure and high leakage in the still growing central city have resulted in low quality of service. There is growing consumer dissatisfaction which makes it difficult for the GOE to introduce necessary higher tariffs as rapidly as desired.

By the mid-1970's approximately half of the city's population were still not being provided with an adequate, safe supply of water. The general inadequacy of water supply services in Cairo, especially in summer, and in districts with poor housing conditions, has been linked by responsible GOE officials to the increased incidence of various water-borne and water related diseases such as infectious hepatitis, typhoid and para-typhoid fever, as well as dysentery. There are neighborhoods within the proposed project service area which receive no water at all for lack of distribution pipe.

GOE officials recognize that the present water system deficiencies will only worsen unless a concerted effort is brought to bear on the problems. It is anticipated that Cairo will experience further major population increases over the coming decades as the country becomes predominantly urban. Increasing numbers of persons will require and demand water services from a system which is already seriously inadequate.

It is clear to both the GOE and AID that without an adequate water supply system, real private sector development in Cairo will be handicapped. It is understood that a reliable supply of potable water is essential for sustaining or expanding industrial facilities in the Cairo area. In summary, an improved water supply system is essential to sustain economic development and create a stable society capable of providing basic human support services for Cairo's large and growing population.

1.2 The Cairo Water System

The Cairo Water Company was established by a French company in 1865 to supply water to the city of Cairo. The company later became an Egyptian

joint stock company and was subsequently transformed into a public institution called the Cairo Water Utility Administration, then into The Cairo Water Company, and, finally by Presidential Decree in 1968, it became The General Organization for Greater Cairo Water Supply (GOGCWS).

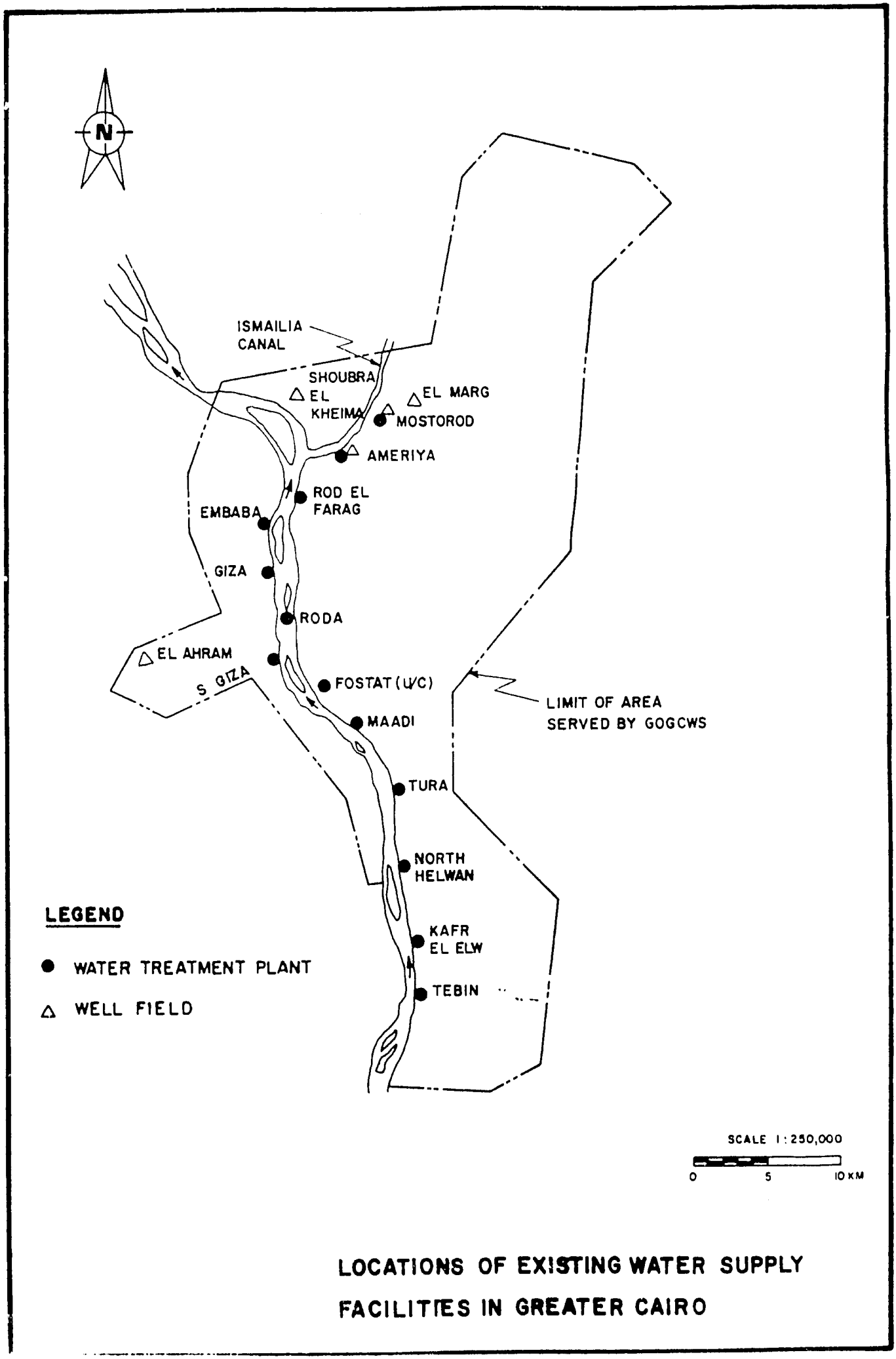
The Cairo water system currently produces about 2.8 million cubic meters of water per day. The water is distributed from twelve filtration plants. There are ten treatment plants along the Nile and two more located adjacent to the Ismailia Sweetwater Canal. More than 80% of the current production comes from the Nile (surface) while the remainder comes from groundwater (we[illegible] The locations of the existing water treatment plants and well fie[illegible] a[illegible] shown in Figure 1.1.

The twelve filtration plants have been built and expanded over the last 80 years. The individual plant production capacities vary from 7,000 m^3/d at Tura to 800,000 m^3/d at the rehabilitated Rod El Farag Plant. Throughout the older filtration plants, several common problems are evident in the treatment process:

- Raw water intakes and pumping stations, as a result of multiple expansions, are poorly arranged, lack standardization of units, have little or no standby capacity or emergency power.
- The feed of chemicals to the clarification process is not adequately controlled.
- The clarifier and filter designs are often deficient resulting in mixing, settling and short-circuiting problems.
- At peak hydraulic demands the water quality deteriorates due to equipment limitations.
- The water reservoirs for the plants have inadequate capacities, commonly holding less than two hours of storage at average production rates.
- Finished water pumps often suffer from the same problems found in the raw water pump stations.
- Complicated piping causes large headlosses.
- Standby power equipment is commonly not available or is inadequate to maintain average production.
- Safety precautions in chlorination and mechanical equipment areas are virtually nonexistent.

<u>In short, too little water of too low quality goes into a distribution network which has too many leaks</u>.

Figure 1.1



LOCATIONS OF EXISTING WATER SUPPLY FACILITIES IN GREATER CAIRO

The water produced by the combination of surface and well facilities is distributed to eight service areas as shown in Figure 1.2. The transmission and distribution system contains 3,200 kilometers of pipelines, of which about 50 percent are street distribution mains which are too small. Less than 10 percent of the pipes have diameters of 600 mm to 1200 mm which would be adequate for this type of distribution system. Sixty percent of the pipe was installed before 1971 and about 12 percent is more than 40 years old.

The central city system is served by the Rod El Farag water treatment plant. It is Cairo's most important and largest distribution area. Rod El Farag services the major tourist hotels, historical areas, commercial establishments as well as a cross section of residential districts. The plant is situated on the east side of the Nile river and includes some 1,775 km of pipelines ranging in diameter from 50 mm to 1,200 mm.

The distribution system is plagued with many problems. The systems connected to newer water treatment plants are operated purposely at pressures below required levels. The lower pressures are necessary to avoid ruptures and major leakage in the older and/or weakened pipelines. The actual operating pressures often fall to less than one-third of design pressure levels during the summer peak demand periods. Because of this, the reservoirs do not fill and water is inadequately supplied.

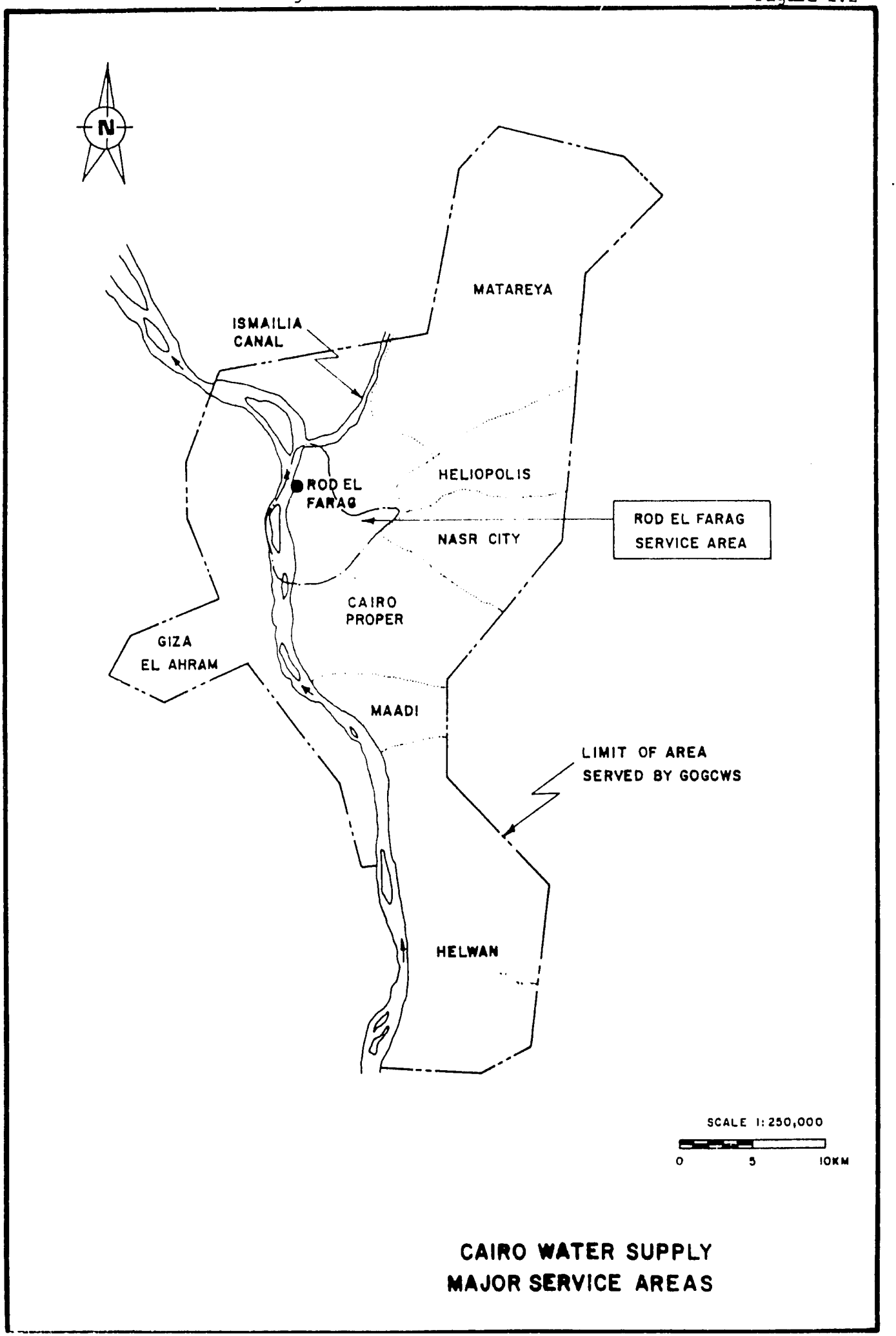
Leakage and wastage surveys within the distribution system have shown that a large percentage of all water produced is not beneficially consumed. It is either leaked from the distribution system or wasted by users. Surveys of user demand indicate that the total wastage is approximately equal to 40 to 50 percent of production.

1.3 Recent Activities to Improve the Water Supply System

In response to the critical need for improvement in the Cairo water supply system, GOE launched a substantial multi-assistance development program. With A.I.D. assistance, they completed the Cairo Waterworks Master Plan early in 1979. The Master Plan recommended improvements in two parts. Part I, immediate phase, covered the period from 1978 through 1982. The major objectives of the immediate phase plan were to provide engineering, planning, and financial information to the GOGCWS on future demands and to improve the reliability of the water service to the consumers in the Greater Cairo area.

Part II, staged development, covered the period 1982 to the Year 2000. The objectives were to develop sources to satisfy the projected demand and to define the associated treatment plant, transmission, distribution and storage requirements. The U.S. and other donors responded by completing the following work:

Figure 1.2



CAIRO WATER SUPPLY
MAJOR SERVICE AREAS

- Under the Cairo Water Supply I Project (263-0038) AID provided a total of $97.4 million to finance: the rehabilitation and expansion of the Rod El Farag Water Treatment Plant; the procurement of six kilometers of ductile iron pipe and necessary valves; engineering design and construction supervisory services; and technical assistance to upgrade the overall management capabilities of GOGCWS, with particular emphasis on the operation and maintenance of the new Rod El Farag Plant. Upon completion of the treatment plant expansion in August 1986, the rated capacity of the facility was increased from 350,000 m^3/d to 800,000 m^3/d; however, the plant cannot be operated at this capacity because of the deficiencies in the distribution system.

- The Arab Cooperation Fund has provided the foreign exchange (Kuwait Dinar 9.6 million) for the construction of the new Fostat Water Treatment Plant which is currently under construction. The plant will have a capacity of 600,000 m^3/d. It was planned that the plant would be completed during 1983, but the present anticipated completion date is December 1988. The project also includes 45 km of 800 to 1400 mm ductile iron transmission main.

- The Embaba plant which is now almost in operation with a capacity of 300,000 m^3/d was financed by the West German KFW (DM 60 million). The project also provides 35 km of 600 to 1600 mm ductile iron transmission main.

- The French Cooperation Fund has provided FF 65 million for the expansion of the Mostorod water plant from 450,000 to 650,000 m^3/d and FF 70 million for Phase I of the Shoubra El Khima water treatment plant (200,000 m^3/d).

- The Japanese water supply project is providing 215 km of pipelines, several pumping stations, and seven storage reservoirs with a total capacity of 120,000 m^3/d.

As can be seen by the above activities, AID is the lead donor country in the Water Sector. In addition to infrastructure work, AID is working toward policy reform. On 22 January 1984, AID and the GOE signed a Memorandum of Understanding (MOU) and thereby formally agreed to support a major long term program to develop the water and wastewater services in Egypt. The MOU set an overall AID funding level of $1.2 billion for projects in the sector to be completed prior to 1989. Particular emphasis was given in the MOU to the completion of the Cairo West Bank activities. It was also agreed in the MOU that certain significant actions would be undertaken during this same period to improve the GOE's capability to operate and maintain the water and wastewater facilities and to begin to recover cost through a gradual introduction of appropriate tariffs and surcharges. (For a complete discussion and text of the MOU, see Annex H, Cost Estimates and Financial Analysis.)

TABLE 1.1

SCHEDULED WATER TARIFF INCREASES

		Apportionment Water consumption	Rate milliemes per m^3 pre 1985	July 1985	Jan. 1988	July 1988	Proposed by 1991
1.	Household use	57%	12	30	45	60	85
2.	Governmental buildings	7%	6	100	60	70	100
3.	Commercial and industrial	12%	12	100	90	110	180
4.	Services, hospitals, schools	11%	12	70	90	110	180
5.	Tourism & recreation activities	7%	12	150	250	300	450
6.	Investment & free zones companies	6%	12	200	250	300	450
	TOTAL (Avr.)	100%	11.6	66	83	103	155

Notes:

1. It is estimated that the current cost of treatment and delivery of a cubic meter of water is 270 mill/m^3. Of that total, 100 mills are for O&M and debt services charges (62 mills for O&M and 38 mills for debt services) and the rest for depreciation expense and return on investment.

2. Our memorandum of understanding (MOU) calls for tariff increases to cover the O&M and debt service by 1991. The proposed 155 mill/m^3 may exceed this requirements.

3. The rates shown above for domestic users are for the first 30 m^3/month. For more than 30 m^3/month the rates are 70 mill/m^3 for July 1988 and 100 mill/m^3 for 1991.

4. In addition to potable water, water utilities also provide raw water for such purpose as gardening, watering public parks, etc. Raw water tariff was 6 mill/m^3 pre 1985, is now 30 mills and will be increased to 60 mills.

5. Wastewater tariffs are non-existent at present throughout Egypt. However, a 10% surcharge is added to the water bill to help defray the cost of wastewater services.

6. Flat rates based on the number of rooms in the household are used for unmetered connections.

7. At the present time, most governmental agencies do not pay their water bills.

8. It is planned to raise the rates annually to reach those shown above for 1991.

9. The unaccounted (difference between production and sales) in the Provincial Cities is about 27% of the total water production, in Ismailia is about 40% and in Alexandria is about 48%, while in Cairo the total water sales (mostly based on estimates) was 102% of the total water production in the year 1986/1987.

1.4 Existing System Needs and Project Context

1.4.1 Inadequate Resources for Growing Population

The Cairo water supply system continues to be overwhelmed by the demands for water from the expanding population. The current population of Greater Cairo is estimated to be between 12 and 14 million. The city has undergone a dynamic rate of growth in recent decades --- the population in 1960 was less than 5 million --- and high growth rates are expected to continue. In the Year 2000, the population is expected to be 16 million or more. Rapid growth and urbanization have strained the Cairo water supply system and have necessitated its continual expansion and rehabilitation.

A plan recently presented by the Chairman of the GOGCWS indicated that more than $2 billion are required for expansion and rehabilitation through 1992 to meet the projected demands for water service. While the cost of providing services is increasing dramatically, the ability of the GOE to fund the improvements is diminishing. The current Five Year Plan only contains the financing for the construction of 2.3 million m^3/d of water production capacity in Cairo. The GOGCWS, on the other hand, had requested LE 1.2 billion to increase production by 3.2 million m^3/d.

1.4.2 Deterioration of Infrastructure

The situation appears even more alarming when one considers the conditions of the existing water supply infrastructure. As detailed in the Technical Annex a large portion of the present treatment facilities and distribution network is old and problem-plagued. The problems existing in the Rod El Farag water transmission and distribution systems are particularly serious since this area (35 km^2) includes the central commercial, tourist and residential areas of the city.

Although the expanded Rod El Farag treatment plant, financed under AID Project No. 263-0038, is now fully operable, it cannot be used to full capacity because of deficiencies in the water distribution system. The distribution network of approximately 590 km of pipeline, ranging from 100 mm to 1200 mm in diameter, includes mains that are over forty years old. There is history of severe leakage and rupture. Other more recently installed pipelines made of steel are known to have been badly corroded due to stray electrical current from the tramways. Currently, the maximum pressure in the system is held down to about 45 m head. The finished water pumps at Rod El Farag would generate 60 m head at full design discharge. Until these shortcomings are remedied by an extensive upgrading of the distribution network, full benefit will not be achieved from the large AID investment already made to expand the treatment plant facilities. Were this project not undertaken, many consumers will continue to suffer the difficulties and health risks associated with an inadequate water distribution system, and many of the poorer areas of Cairo will continue to have no access to piped water at all.

1.4.3 Institutional Weaknesses

In addition to the basic infrastructure inadequacies, GOGCWS also faces serious institutional weaknesses. GOGCWS is attempting to provide good service to consumers with an organization which lacks adequate budgetary support for operations and capital investment, an antiquated organizational structure, an under trained cadre of workers, an inadequate salary structure and insufficient exposure to well managed like - sized utilities. The result is an organization which could greatly benefit from a program of institutional strengthening through a collaborative approach. Unless there are organizational changes within GOGCWS, the quality of service is expected to deteriorate further in spite of the massive capital investments; operational crises will continue; maintenance will be costly in the absence of an effective system-wide preventative program and the ability to collect revenue (or raise tariffs) will be hampered.

The implications of not addressing the above described problems include further reduction in the quality of water service for the greater Cairo area. The continued institutional weakness on the part of the GOGCWS, after considerable U.S. technical assistance to that organization, also must be addressed, in order that the sizable investment that both the US and GOE have made in the water and wastewater sector will be not be lost.

It is recognized by the GOE and GOGCWS that they must take appropriate complementary actions of (a) further raising revenues through tariffs which cover capital investment requirements; (b) work collaboratively to carry-out the necessary organizational changes necessitated by growth; (c) facilitate the establishment of an effective training department; (d) and adopt an attitude toward construction implementation which will lessen the costs associated with untimely decision-making.

1.4.4 Project Context

Implementation of the proposed project is high on the priorities of the new GOE five-year plan and directly supports the objectives of the Mission's CDSS. In particular, the Cairo Water Supply II project will directly support GOE efforts to increase Cairo's available water supply by approximately four million cubic meters per day before 1992. The proposed project will also support efforts to improve the institutional capability of the Cairo water utility as set forth in the 1984 MOU. In addition, the proposed project will represent a significant contribution towards completing the agreed to AID financed investments and, at the same time, ensure that the improvements made to date in the Cairo water system are maintained. While other donors are active in the sector, none appear to be interested in finishing this important last link in upgrading the Greater Cairo distribution system. There appears to be even less interest, on the part of other donors, in the more challenging and perhaps more important institutional strengthening aspect of upgrading GOGCWS skills.

2.0 PROJECT DESCRIPTION

2.1 Project Goal and Purpose

The Cairo Water Supply II project will continue USAID's assistance to GOGCWS with both infrastructural and institutional development. The goal of the project is to improve sanitation and health conditions for the twelve to fourteen million people living and/or working in the greater Cairo area. The project's purposes are to: (a) rehabilitate and expand the central city water transmission and distribution and facilities; and (b) strengthen GOGCWS institutional capacity to operate and maintain the entire Cairo water supply system. A description of the project activities is presented below.

2.2 End of Project Status

The improved Rod El Farag system will directly benefit two million Cairo residents. Presently unconnected areas will have access to water. Low income residents will have access to a revolving loan fund to finance water and sewer connections. The capacity to expand in growing commercial areas will exist.

The entire city will benefit from better management by GOGCWS. A modern centralized research laboratory will monitor water quality and set the stage for future improvements in treatment processes. Operation and maintenance will have significantly improved through upgrading of facilities, the availability of proper equipment, tools and spare parts, skills training, and better supervisory procedures. Water wastage will be significantly reduced by meter testing and repair, leak detection programs, and increased public awareness. Revenues will improve with modern, functioning and financial departments. The training department will offer a full range of courses from in-house training for unskilled workers to the identification of management courses for their top executives. Finally, GOGCWS will have established an on-going relationship with a U.S. utility from which they can obtain maintenance and systems operation advice.

2.3 Project Elements

2.3.1 Infrastructural Development

The first major component of the project will upgrade and expand the service network of the central city area. This area distributes water to consumers from the new rehabilitated Rod El Farag water treatment plant.

2.3.1.1 Rehabilitation of Transmission System

Approximately 20 km of new transmission pipelines will be installed in the central city service area to increase hydraulic capacity and replace existing pipelines that are badly corroded and/or leaking. The design phase services will include detailed investigations to determine whether

and where rehabilitation work may be substituted for pipeline replacement. The anticipated locations, diameters, lengths, and functions of these pipelines are shown in Table 2.1.

TABLE 2.1
PROPOSED TRANSMISSION PIPELINES

	Location	Diameter (mm)	Length (m)	Function
1	Rod El Farag to Gamrah Bridge	1,200	4,050	Improved hydraulic capacity
2	Abbasseya to Gabal Ahmar	1,200	1,650	Improved hydraulic capacity
3	Salah Salem St. & Khalifa Mamoune St.	1,000	5,800	Improved hydraulic capacity
4	Ahmed Helmi St. (Ezbet Wahba Mantah to Ramses Sq.)	1,000	5,450	Replacement
5	Ramses St. (Ramses Sq. to Gambrah Bridge)	800	1,970	Replacement
6	Sebteya	1,000	1,070	Replacement
	TOTAL		19,990 m	

2.3.1.2 Expansion of Distribution Network

Approximately 33 km of new distribution pipeline will be installed in the service area. See Table 2.2. The GOGCWS will work with the General Organization for Sewer and Drainage (GOSD) to ensure that complementary wastewater infrastructure is available to these neighborhoods. In addition, the GOE will establish a revolving fund for loans to homeowners for the purpose of financing connections to both the public sewers and the public water mains.

TABLE 2.2
PROPOSED DISTRIBUTION PIPELINES

Diameter (mm)	Length/Function (m)		Total Length (m)
	Replacement	Improved Hydraulics Capacity	
150	--	23,300	23,300
200	--	2,100	2,100
300	850	2,500	3,350
400	1,850	1,500	1,350
600	650	--	650
Totals	3,350 m	29,400 m	32,750 m

2.3.1.3 Water Storage Reservoirs and Booster Pumping Stations

Current water storage capacity in the general Cairo area is grossly inadequate. Approximately 110,000 m^3 of additional storage is required for adequate provision for peak hourly demands and firefighting purposes (four hours supply). The estimated additional storage capacity will be provided by construction of the five new storage reservoirs described in Table 2.3. All reservoirs will be of reinforced concrete and located at ground level. Three low-lying reservoirs will feed into companion booster stations which will be sized to meet peak hourly demands with a 50% standby pumping capacity.

TABLE 2.3
PROPOSED STORAGE RESERVOIRS

Location	Recommended Capacity (m^3)	Booster Pumping Required?
Gamrah Bridge	20,000	Yes
Ezbakia Garden	20,000	Yes
Abbasseya	20,000	Yes
Nasr City	20,000	No
El-Azhar St./Salah Salem St.	40,000	No
TOTAL CAPACITY	120,000 m^3	

2.3.1.4 Facilities Training

The various facilities to be constructed under the project---reservoirs, booster pumping stations, and other network appurtenances---will require "hands-on" training for the GOGCWS employees responsible for facilities operation and maintenance with training, department participation, contractor selected to construct and install the equipment. The contractor will conduct a training program for local operators to familiarize them with the new equipment and the required operation and maintenance procedures. Supervisors will also receive training which will include the development and use of maintenance checklists and other systematic approaches to ensure operators are following correct procedures. An operation and maintenance manual in English and Arabic will be prepared for use in future courses and as a reference for operations personnel.

2.3.2 Institutional Development

The Cairo Water Supply II Project will provide organizational and technical systems support in the following areas:

- o Manpower Development and Training
- o Establishing a "Twinning" Exchange Arrangement with a U.S. Water Utility
- o Purchasing and Inventory Management
- o Generic Systems Improvements
- o Computer Center and Automation Program
- o Upgrading Maintenance Facilities and Equipment
- o Establishing a Central Laboratory

2.3.2.1 Manpower Development and Training

The GOGCWS organization suffers from a severe lack of trained personnel at almost every level of the organization. The dynamic growth of Cairo and of its water needs is increasingly straining its manpower resources and capabilities.

The proposed training program in this project will address the need to expand the existing GOGCWS training program. In other Egyptian water/wastewater sector training programs, AID has found that practical, hands-on training, coupled with systematic, on-going performance monitoring for needs assessment and evaluation, has generally been the most effective. It is therefore proposed that this program contain a balanced mix of pre-service and in-service classroom, hands-on, and practical training.

Prior to the initiation of program activities, GOGCWS will expand its training department to include sufficient budgetary resources and sufficient administrative, instructor and support staff. GOGCWS will provide ample facilities to house the training classrooms, workshops and offices, using funding from the Special LE Account.

Training systems development will be conducted primarily at GOGCWS facilities to strengthen the skills of the Training Department's planning, implementation, and evaluation divisions. Advance training will also be programmed for senior and/or specialized Training Department personnel in-country, in the U.S., or in a third country. (All participant training elements will be accomplished in accordance with the policies, allowances, guidance, and reporting requirements of AID's Participant Training Handbook 10.) The program will involve at least six major activities to include: Instructor Training, Program Identification, Program Development, Implementation, Monitoring and Evaluation, and Modification and Follow-up. The project financed consultant will procure the commodities, equipment and supplies required for training. (See Annex M, Training Assessment for an illustrative commodities list.)

At the conclusion of this project activity, GOGCWS will have a fully operational training department with the staff, curriculum, equipment and budgetary resources to support the long-term training needs of GOGCWS' organizational divisions. GOGCWS' Training Department will have the developed skills to adapt and design O&M training modules, technical and managerial courses, standard procedures, and evaluation systems to meet GOGCWS' manpower training needs. It is envisioned that this technical assistance element will include approximately 244 person-months of expatriate and 240 person-months local consultant services in addition to equipment/commodity inputs.

2.3.2.2 Twinning Exchange Arrangement with a U.S. Water Utility

Previous experience in providing technical assistance in management skills in the sector has not been noticeably successful. The introduction of consultants into an operating utility means that the consultants initially take up much of the managers' time, returning little until late in the contract. Often the output is a report which is not seen as particularly useful. On the other hand, managers and top technical personnel appear to learn quickly and respect the judgment of U.S. managers and engineers who are actively involved in running a utility. The purpose of this project element is to establish a relationship between utility managers and senior technical personnel similar to that formed between the Ministry of Irrigation's Water Research Center and the Salt River Project in Arizona. If successful, this organizational relationship will extend beyond the life of the project and will serve as a ongoing tool for management and systems upgrading.

The Institutional Development Contractor will assist in identification of an appropriate twinning institution and coordination between the two utilities. This project activity will finance a program ... The U.S. counterparts will also visit Cairo, observe GOGCWS procedures and assist their Egyptian counterparts in needs identification, design of program, resolution of problems, upgrading of skills and the transfer of new technologies.

This project activity will finance a program of visits by GOGCWS personnel to a selected water utility in the United States. These personnel will meet and work with counterpart staff members in order to observe management and supervision styles and receive hands-on training with appropriate systems and equipment. It is anticipated that this program will involve approximately 60 person-months of GOGCWS participation in the Unted States. All U.S. observational visits will be planned and implemented in accordance with AID Handbook 10 -- Participant Training. The U.S. counterparts will also visit Cairo, observe GOGCWS procedures and assist their Egyptian counterparts in problem resolution, upgrading of skills and the transfer of new technologies.

2.3.2.3 Inventory Management

Management consultants James M. Montgomery (JMM), under the Cairo Water Supply I, identified that efficient procurement of supplies and effective storage and management are serious problems in GOGCWS. This project proposes to undertake structural rehabilitation of some of the warehousing facilities, procurement and installation of needed storage shelves, bins, and handling equipment; re-inventorying of stock; stock coding and cataloging; design of optimum storage layout and arrangement of materials; disposal of scrap and obsolete materials; design and implementation of an inventory control management system; and training in inventory management, control, handling, and placement.

Technical assistance will be provided to GOGCWS to develop an efficient system for the cost-effective management of supplies and stores. This will replicate the progress made at the Rod El Farag plant warehouses by the JMM consultant under the "Model Warehouse" Activity throughout the utility stores. This element will include approximately 96 person-months of expatriate and 558 person-months of local technical assistance to train and assist GOGCWS in inventory control. These activities will build the institutional capacity of GOGCWS with regard to retrieval of spare parts on-hand and procurement of necessary additional parts. These activities will, therefore, significantly improve the ability of the utility to operate and maintain the upgraded system.

2.3.2.4 Generic Systems Improvements

It is expected that a significant portion of increasing Cairo's future water supply should be achieved through modernization, rehabilitation and expansion of existing treatment plants. Before such a program can start, however, it is necessary for predesign studies to be conducted to identify potential areas for expansion and modification of each filtration facility. These filtration studies will include the testing of alternative treatment plant processes using a small pilot plant to be designed and procured as a part of the project. In a large organization like GOGCWS, pilot studies should be considered standard operating procedure due to the sheer volume of water being treated. New

technologies can be tested without large financial outlays. Additionally, the project will study the difficulties experienced by GOGCWS in accurately measuring water flow from the treatment plants. By introducing the ability to test ideas for themselves, GOGCWS will achieve a major step in its institutional development. It is estimated that 36 person-months of expatriate and 111 person-months of local effort will be required to complete the studies.

The problem of water wastage was outlined in Section 1.2. New meters will be provided by the project for approximately 20% of the service connections of 100 mm diameter and larger. GOGCWS will then start a program of replacement and repair of meters for large consumers. The project will also assist GOGCWS with the design and implementation of a major public awareness campaign through radio, television, newspapers, magazines and handbills. This campaign will sensitize the public to the problems of water wastage and the cost to the nation of such wastage. GOGCWS is expected to take action to have building regulations incorporate more stringent requirements for plumbing and to undertake a program of refitting government buildings with new faucets and toilet valves. Under this project element, maintenance facilities and equipment will be upgraded and the needs for improved meter testing and repair facilities will be assessed. It is estimated that this element includes 36 person-months of expatriate and 72 person-months of local technical assistance.

2.3.2.5 Modernization of Accounting and Financial Systems

This component will assist GOSD in establishing modern accounting and finance departments with improved collections and analysis of service costs, revenue alternatives, system efficiency, and financial performance. Critical administrative and financial tasks to be automated are computerized general ledger, budgeting, purchasing, revenues, accounts payable, payroll, personnel, inventory control, cost accounting and utility billing and collection. The central system will have sufficient capacity to fulfill the data management requirements of the entire GOGCWS. The existing IBM computer will be incorporated into the new system, subject to study during system design. Microcomputers will be used at 15 locations with compiled data transported by courier. The system will be designed to permit telemetry linkage in the future.

Project implementation will be phased to replace existing systems over a two-year period to avoid overloading GOGCWS with too many new activities and ensure that each system is fully tested and reliable. The project will fund both the procurement of equipment, and approximately 301 person-months of expatriate and 165 person-months of local technical assistance in facility design, installation supervision, and staff training.

2.3.2.6 Upgrading Maintenance Facilities and Equipment

This activity will address the serious deficiencies in management systems, facilities, equipment and tools required for GOGCWS's operation and maintenance activities. The technical assistance for this activity will first study the detailed requirement for new and existing management systems and facilities. These studies will also determine the needs for maintenance workshops and equipment necessary for adequate meter repair and calibration. Following an evaluation of all requirements including training and preparation of procurement documents, the contractor will proceed with procurement, upgrading of facilities and training. Procurement for tools and equipment will be made under a requirements contract or ordering agreement. This element will require approximately 36 person-months of expatriate and 57 person-months of local technical assistance.

2.3.2.7 Central Laboratory

This project activity will assist GOGCWS in establishing a central research laboratory for water related testing and research. Currently, laboratory work is performed at each of the water treatment plants. These plants lack proper equipment, and laboratory personnel are neither experienced nor trained in sophisticated testing procedures. A central laboratory is needed to support the plant laboratories with regard to the more complex and critical water quality tests. This laboratory will also serve as a research facility for such work as bench and pilot-scale studies of water treatment processes discussed in 2.3.2.4. GOGCWS intends to locate the Central Research Laboratory at the new Fostat Water Treatment Plant, where a suitable building is currently under construction for this purpose.

The project will provide for the procurement and installation of laboratory equipment and the procurement of a two-year supply of glassware, chemicals, and spare parts through a requirements contract or ordering agreement. This activity will require approximately nine person-months of expatriate and five person-months of local technical assistance for the supervision of equipment installation and the training of GOGCWS laboratory staff in the proper application of equipment and procedures.

3.0 COST ESTIMATES AND FINANCIAL PLAN

3.1 Project Cost Estimates

The Project cost estimates are based upon sound technical and cost analyses performed by ES-Parsons, the Cairo Water Supply I consultant. In developing the Project cost estimates, the consultant relied heavily on both AID's and GOGCWS's recent experience on similar projects and contracts. In addition, considerable effort was expended in contacting materials suppliers in order to obtain current materials and shipping costs. A disbursement plan was developed based on the proposed implementation schedule. The rates used for inflating foreign exchange and local currency costs represent the best judgment of the Mission economists.

It is the conclusion of the project committee that the requirements of Section 611 (a) of the Foreign Assistance Act of 1961, as amended, have been satisfied. The Mission finds the technical and cost analyses to be acceptable within the intent of the satutory requirements.

A summary of escalated costs for each major project component is presented in Table 3.1. Table 3.2 gives a more detailed presentation of cost estimates. The total project cost is $97.9 million and LE 101.8 million.

TABLE 3.1
CAIRO WATER SUPPLY II PROJECT
SUMMARY COST ESTIMATES AND FINANCIAL PLAN
(Millions of $)

PROJECT INPUTS	USAID FX	USAID LC	GOE LC	GOE "IN-KIND"	TOTALS
Network Upgrading	62.9	0.5	22.4	3.0	88.8
Institutional Development	29.8	5.3	--	4.2	39.3
Project Contingency	4.9	0.3	1.1	—	6.3
Audit & Evaluation	0.3	—	--	—	0.3
TOTALS	97.9	6.1	23.5	7.2	134.7*

Note: Local currency contributions are based upon a life of project average exchange rate of $ 1.00 = LE 2.76

GOE "in-kind" contribution is estimated to be LE 20 million.

* Exterior to the Project, an additional $.9 million (L.E. 2.5 million) will be provided as a revolving fund for water/wastewater connection in unwatered areas, bringing total project related cost to $135.6 million.

TABLE 3.2
CAIRO WATER SUPPLY II PROJECT
DETAILED COST ESTIMATES FOR MAJOR ACTIVITIES
(Millions)

PROJECT ELEMENTS & COMPONENTS	US$	LE
NETWORK UPGRADING		
Land Acquisition	—	26.4
Construction Supervision	3.1	1.5
Transmission Pipelines	18.6	5.2
Distribution Pipelines	1.1	1.5
Reservoirs	34.0	23.5
Booster Stations	5.4	4.3
Facilities Training	0.7	0.8
Subtotals	62.9	63.2
INSTITUTIONAL DEVELOPMENT		
Manpower Development	5.4	4.3
Twinning	1.8	0.7
Inventory Management	3.9	5.3
Generic Systems Improvements	4.8	1.0
Modernization of Accounting and financial system	8.7	1.2
Upgrading Maintenance Facilities	3.6	1.9
Central Laboratory	1.6	0.3
Subtotals	29.8	14.7
PROJECT CONTINGENCY	4.9	3.9
AUDIT & EVALUATION	0.3	--
TOTALS	97.9	81.8

3.2 Financial Plan

3.2.1 General

AID's contributions over the life of the Project will be $104 million. GOE cash contributions to the Project are estimated to be equivalent to $23.5 million in local currency, LE 64.8 million using an assumed life of project exchange rate of $1 = LE 2.76. The GOE "in-kind" contribution to provide support personnel, office space and training facilities is estimated to be L.E 20 million. The financial plan includes land acquisition by the GOE equivalent to $9.6 million which is part of the cash contribution because the land must be purchased. The plan does not provide for any salary supplements. Not included in the plan, but an integral component of the Project, is LE 2.5 million of special account funds to be used for the establishment of a revolving fund for loans to assist homeowners in connecting to the public sewers and water mains.

3.2.2 Funding Responsibilities

AID grant funds will finance the foreign exchange costs for the two construction contracts and both foreign exchange and local currency costs for the construction management/engineering services contract and the institutional development/technical assistance contract. The GOE will acquire the land and finance all local currency costs affiliated with the two construction contracts including land acquisition for the storage reservoirs.

AID will provide financing for all foreign exchange costs from ESF account funds granted to GOGCWS for nost country contracts. Payment will be made by USAID through direct letters of commitment.

The GOE will provide local currency (LE) funding for the construction contracts, which will include funding of social insurance, custom, taxes and other support fees assessed by the GOE. These funds will be paid through letters of credit with local banks. AID will provide the local currency for the engineering services and technical assistance contracts. These funds will be disbursed by USAID against separate LE invoices submitted by each contractor. An advance revolving fund equal to 10% of the LE budget amount will be established.

3.2.3 Disbursement Projections

Table 3.3 provides a schedule of disbursements for both foreign exchange and local currency. It is assumed that the project will begin early 1989 and be completed by the end of 1993. All U.S. dollar costs were escalated using an annual inflation rate of 5%; all Egyptian pound costs were escalated using an annual inflation rate of 12% for 1989, 10% for 1990, and 8% for all subsequent years.

TABLE 3.3
CAIRO WATER SUPPLY II PROJECT
SUMMARY CASH FLOW PROJECTION
(Millions of $)

	1989	1990	1991	1992	1993	TOTALS
USAID FX	1.9	27.6	25.1	24.4	18.9	97.9
USAID LC	0.5	2.2	1.5	1.1	0.8	6.1
GOE LC	0.0	13.2	3.8	4.0	2.5	23.5
TOTALS	2.4	43.0	30.4	29.5	22.5	127.5

3.3 Assessment of GOGCW's Contracting and Voucher Examination Capabilities

GOGCWS is the Government of Egypt implementation agency for the original Cairo Water Supply Project and will serve in the same capacity for this Project.

Throughout the implementation of Cairo Water Supply I, GOGCWS performed well in the review of project documents, the approval and award of contracts, and the overall management of contractor performance. In our opinion, GOGCWS supported by their engineering consultant has the contracting capability to satisfactorily acquire and manage the construction services needed for implementation of the Cairo Water Supply II Project.

Based on our review and USAID's extensive prior experience with the GOGCWS voucher examination process, it is our opinion that the voucher examination procedures of GOGCWS are satisfactory. USAID can rely on the validity of GOGCW's performance certificate and voucher review.

3.4 Audit Coverage

Funds provided by this project will be used to finance two lump sum, fixed price host country contracts with U.S. companies. Since these are lump sum, competitively bid, fixed price contracts they are not subject to audit of costs except for any cost-reimbursable items. They are, however, subject to audit for compliance with other AID regulations and, therefore, a small amount of audit funds are allocated for this purpose. This phase

will have two host country contracts for consulting services. Funds will be used to finance one AID direct contract with a U.S. A&E firm and one host country contract with a U.S. management consulting firm. The Project budget includes approximately $100,000 to cover the estimated auditing costs of these contracts. Audit funds budgeted by activity are as follows:

Activity	No. of Contracts	Type of Contract	Audit Funds Budgeted
Construction Monitoring and Engineering services	1	AID Direct	$10,000
Construction - Pipelines	1	HC-Fixed Price	$20,000
Construction - Storage Reservoirs & Booster Stations	1	HC-Fixed Price	$20,000
Institutional Development and TA contract	1	HC-Cost Reimbursable	$20,000

TABLE 3.4
CAIRO WATER SUPPLY II PROJECT
METHODS OF IMPLEMENTATION AND FINANCING

In accordance with the requirements of the Sixteen Payment Verification Policy Statements the following table illustrates the methods of implementation and financing for AID funds as planned in the Cairo Water Supply II Project Paper.

Activity	Method of Implementation	Type of Contract	Method of Financing	Approximate Cost ($000)	Host Country Implementing Agency
1. Construction Monitoring and Engineering Services	A.I.D. Direct	Cost Reimbursable	Direct L/Comm	$ 3,800	GOGCWS - Projects Dept.
2. Construction - Pipelines	Host Country Contract	Lump Sum	Direct L/Comm	$20,700	GOGCWS - Projects Dept.
Construction-Storage Reservoirs	Host Country Contract	Lump Sum	Direct L/Comm	$42,100	GOGCWS - Projects Dept.
3. Institutional Development	Host Country Contract	Cost Reimbursable	Direct L/Comm	$36,800	GOGCWS - Projects Dept.
4. Monitoring, Audit, and Evaluation	AID Direct PSC or IQC	Fixed Price	Direct Requirements	$ 300	--AID--
			TOTAL	$103,700	

The justification for using Direct L/Comms is that the host country does not have the financial resources to make payment and seek daily reimbursement from AID.

4.0 IMPLEMENTATION PLAN

4.1 Pre-Implementation and Planning

The Cairo Water Supply II Project follows and expands on the Cairo Water Supply I Project (263-0038) which rehabilitated the Rod El Farag water treatment plant and provided management consulting services. It is important to define here the critical linkages between the projects.

4.1.1 Infrastructure

The Rod El Farag water treatment plant was upgraded and expanded with the knowledge that full benefit of the plant would not be realized unless the distribution system was comparably upgraded. Review of the Master Plan recommendations and preparation of tender documents is relatively inexpensive and design of the network must be done before work can begin. Therefore, a decision was made in 1986 to employ an engineering consultant, CH2M-Hill, to perform these tasks using funding from a general purpose project, Technical Cooperation and Feasibility Studies (263-0102). The contract was signed August 1987 and design work is now underway. It is scheduled that tender documents will be available in March 1989 for the construction contracts. This has been done in anticipation of authorization of Cairo Water Supply II.

4.1.2 Institutional Development

James M. Montgomery (JMM) has worked with GOGCWS to improve institutional capabilities. Major activities have included organizational analyses and needs assessments, an organizational training plan, a material control (warehousing) pilot program, a leakage and water wastage study, a metering analysis, and analytical services/laboratory development efforts. JMM's previous work will be the base on which the new technical assistance contractor will build. As a result of these previous efforts, the proposed institutional development activities under this Project are ready to commence.

4.2 Implementation Responsibilities

The General Organization for the Greater Cairo Water Supply (GOGCWS) will be the GOE Agency responsible for the implementation of this project. This agency implemented the Cairo Water Supply I (263-0038) and demonstrated their capability to implement water supply projects.

The Office of Urban Administration and Development (UAD) within the Development Resources (DR) Directorate will be the responsible agent for USAID. The UAD Office Director will give overall guidance to the Cairo Projects Branch and will coordinate assistance from other directorates as appropriate. The Cairo Projects Branch is staffed with five permanent professionals: Branch Chief, Project Development Officer, two FSN engineers and an administrative assistant. When and if required, the

Office of Project Support within the Program Development and Support Directorate will provide specialized assistance.

Implementation will require various consultants and construction contractors. Their responsibilities are described in the following section.

4.3 Procurement Plan and Implementation Schedules

Outside technical assistance will be required for:

- The preparation of detailed designs and tender documents,
- The supervision of construction,
- Network O&M training, and
- The implementation of the institutional development program.

4.3.1 Consulting Engineer

An American A&E consulting firm (CH2M-Hill) has been competitively selected to conduct the studies and prepare the tender documents for upgrading and expanding water service in the Rod el Farag area. These services started September 1987 and have an estimated duration of 21 months. Services include the conduct of studies and investigations, detailed engineering design, and preparation of bid documents related to the construction of water pipelines.

It was planned that the design consulting engineer would provide the construction supervision services. The design firm customarily provides this service; however, it is not unusual to change consultants after completion of the tender documents. Since the original tendering for this work, the Directorate for Development Resources (DR) has determined that construction supervision contracts should, in general, be direct rather than Host Country contracts. Once CH_2M-Hill has completed their present scope of work, USAID and the GOGCWS will evaluate their performance and decide whether to continue their services during construction supervision or to select a new firm for these services. If a new consultant is sought, the AID will procure these services in accordance with the FAR.

4.3.2 Operation and Maintenance Training

Network O&M training technical assistance will be included in the construction contractor's scope of services. Course needs assessment, design, implementation and evaluation will be done with participation of the Training Department staff and in coordination with the instititional development contractor.

USAID experience indicates that this mode provides an efficient delivery of services and avoids possible conflicts when an additional party is introduced into the designer/owner/constructor relationship. The consulting engineer will incorporate this responsibility into the construction contract tender documents.

4.3.3 Institutional Development

The institutional development program will require a technical assistance consultant. The seven major institutional development activities will include:

- o Manpower Development and Training
- o Twinning Exchange with a U.S. Water Utility
- o Purchasing and Inventory Management
- o Generic System Improvements
- o Modrnization of Accounting and Financial Systems
- o Upgrading Maintenance Facilities, Management and Equipment
- o Central Laboratory Development

The project committee examined several alternatives for implementing the technical assistance package, and agreed that a single consultant will provide the majority of services and subcontract for the very specialized services. This alternative was chosen because of the important linkages that exist between the major project components with regard to training and management.

4.3.4 Construction

The works to be constructed in upgrading the Rod El Farag service area fall into two categories:

- o Structures, pumping equipment and associated works within the reservoir sites, and
- o Pipeline installation and rehabilitation of the water pipeline network.

It is proposed to implement the project through two host country construction contracts, each to be awarded to a prequalified U.S. construction firm through competitive bidding. It is anticipated that the U.S. constructions firms will joint-venture with suitably qualified Egyptian construction firms or subcontract work to such approved firms.

The FIDIC contract format will be used.

Additional construction work may be identified as necessary to implement the institutional development components of the project. For example, the upgrading or modification of maintenance and training facilities may become necessary. It is anticipated that such works will not be extensive and will be awarded as subcontracts to prequalified Egyptian construction firms on the basis of local competitive bidding.

4.3.5 Commodities

All equipment and materials to be financed by AID funds will be of U.S. or Egyptian source and origin. Equipment and materials procurement options

include contractor direct procurement, and procurement of locally available equipment and materials by GOGCWS or the consultants.

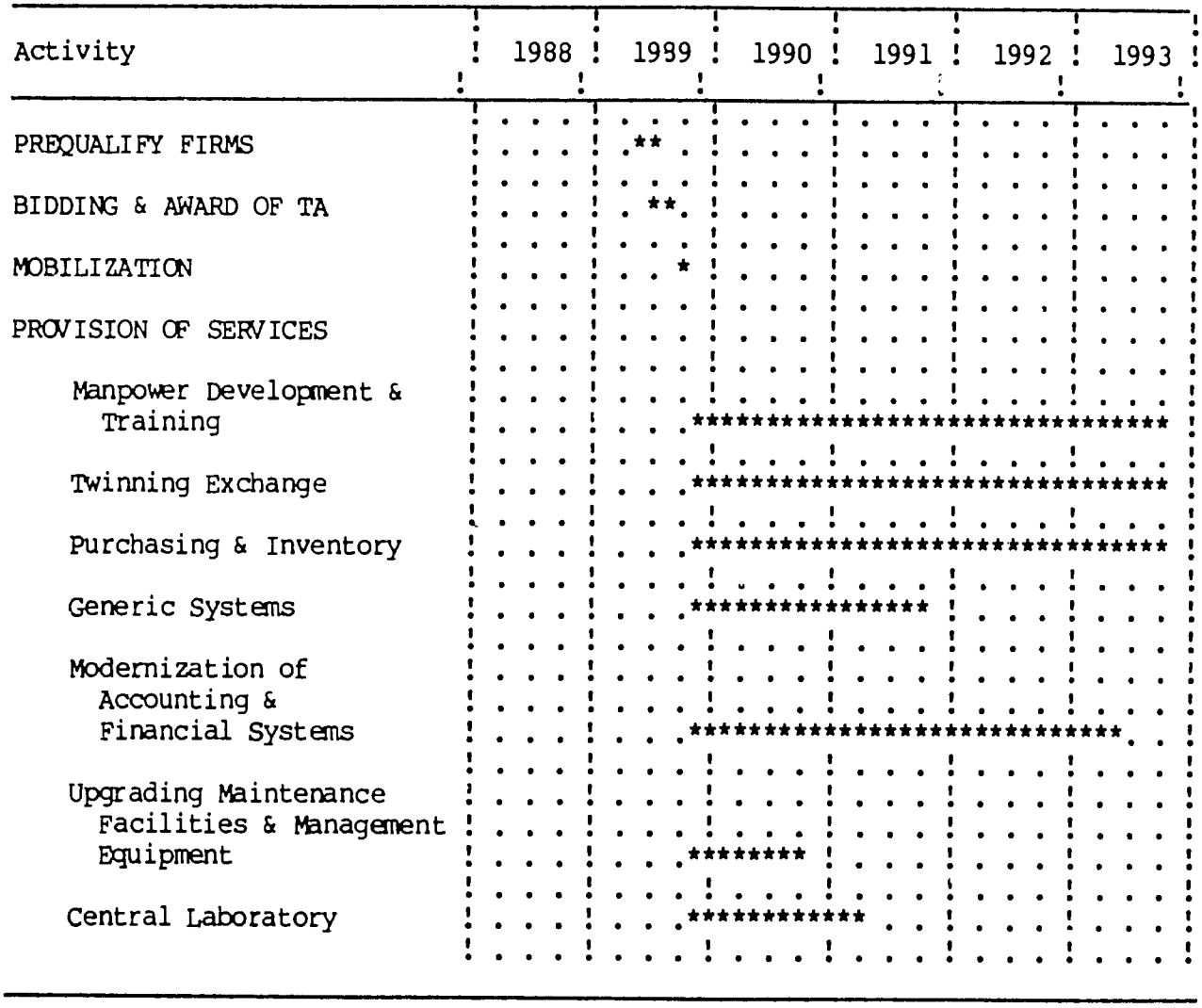
All materials and equipment required for installation under the construction contracts will be directly procured by the construction contractors under their lump sum host country contracts. Construction firms have experienced procurement specialists available to procure the required items and deliver them to the job site as required by their construction schedules. Timely availability of materials and equipment will be of critical importance, so therefore, it is considered best to leave this responsibility clearly in the control of the contractor.

Equipment and materials to be imported for the institutional development program will be procured by the technical assistance consultant. Locally available equipment and materials required for the institutional development components will also be directly procured by the technical assistance consultant using AID host country contracting/procurement procedures (HB11). Commodities will be purchased through a requirements contract or ordering agreement to avoid exacerbating inventory control ad management problems. USAID has found that ordering LOP quantities of equipment and supplies over burdens management and storage capacities and results in duplication of material and deterioration of goods due to improper storage. Under this project, the institutional development contractor will work with the purchasing and inventory management departments to improve management of equipment, commodities and spare parts. Part of this process will be establishing relationships with U.S. suppliers and procedures for timely ordering of spare parts.

4.4 Mode of Contracting and Payment

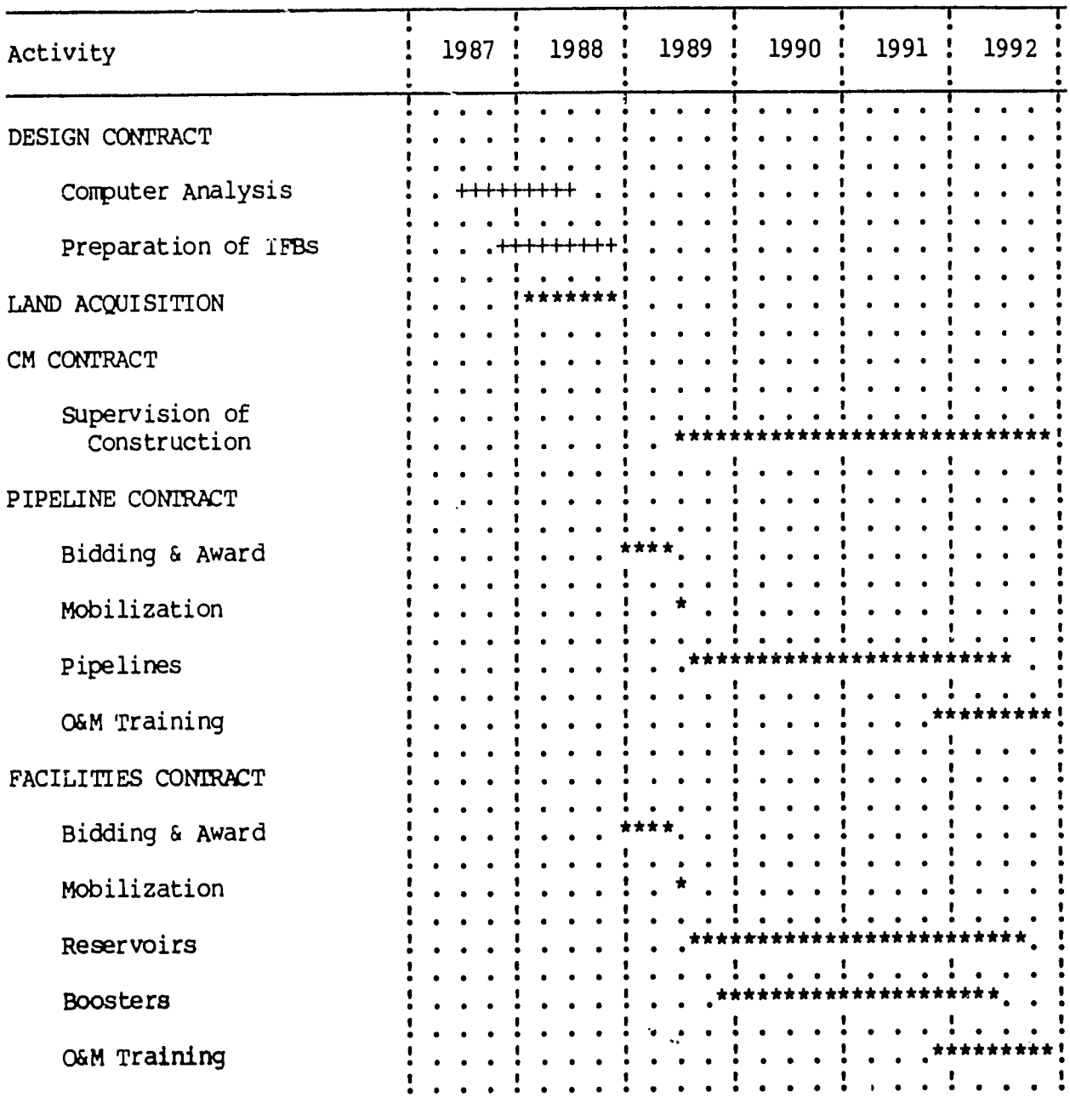
Funds provided by this project will be used for host country contracts (HCCs) between U.S. construction and consulting firms and the General Organization for Greater Cairo Water Supply (GOGCWS). This implementation method has been successfully adopted for predecessor contracts financed by AID for the Cairo Water Supply I Project (263-0038). The contractors will be paid through use of Mission direct letters of commitment and LE letters of credit.

FIGURE 4.1
INSTITUTIONAL DEVELOPMENT SCHEDULE



NOTE: Schedule is based on an April 1988 start and should be adjusted for actual start date.

FIGURE 4.2
CONSTRUCTION SCHEDULE



+++++++ Cairo Water Supply I Project Activities

******* Cairo Water Supply II Project Activities

NOTE: Schedule is based on an April 1988 start and should be adjusted for actual start date.

List of Key Events

Significant events as shown in the illustrative implementation schedules are based on an April start and should be recalculated if that target is not met.

Project Agreement Signed	April, 1988
Advertise for a Technical Consultant (Institutional Development)	July, 1988
Initial CPs met	Aug., 1988
Award of T.A. Contract	Oct., 1988
Institutional Consultants Mobilized	Dec., 1988
Advertising for Contractors for Pipeline and Facilities Construction	Dec., 1988
Award of Contracts	March, 1989
Construction Contractor's (Pipeline + Facilities) Mobilized	May, 1989
Upgrading of Maintenance Facilities and Equipment Completed	Nov., 1989
Central Laboratory Completed	April, 1990
Generic Systems Tasks Completed	Nov., 1990
Facility Specific, Contractor Supplied O&M Training begins	Sept., 1991
Computer Center and System Automation Complete	June, 1992
Booster Stations Complete	June, 1992
Pipelines Completed	July, 1992
Reservoirs Completed	Sept., 1992
Construction Supervision Completed	Dec., 1992
Manpower Training Completed	Jan., 1993
Inventory System Completed	Jan., 1993
Twinning Exchange Completed	April, 1993
PACD	Dec., 1993

5.0 MONITORING AND EVALUATION

5.1 Monitoring of Consulting Engineer

GOGCWS and USAID are responsible for monitoring the consulting engineer's work. This consultant will design the infrastructure improvements and then supervise construction. Monitoring will be through inspection of design reports, vouchers and contents of monthly implementation reports. USAID and GOGCWS will carry out a special evaluation of this consultant's performance in late 1988 to determine whether to utilize this firm for construction supervision.

5.2 Monitoring of Construction Contractors

The engineering consultant will provide construction management and routine supervision to the construction contractors. Problems will be identified and reported to GOGCWS and USAID with recommended solutions in monthly reports. These reports will compare implementation progress with the project schedule. During the construction period, USAID, GOGCWS, the construction contractor and engineering consultant will meet frequently to resolve problems.

As facilities are completed, the construction contractor(s) will prepare an operation and maintenance training program for employees and supervisory personnel of each new facility. The training plan will include an assessment of skills of employees, the level of training needed for them to operate and maintain new facility effectively, and monitoring program to assist supervisory personnel in assessing actual employee performance. Training plans will be submitted to the consulting engineer, GOGCWS Training Department, and USAID for review and approval.

5.3 Monitoring of the Institutional Development TA Consultant

GOGCWS and USAID will monitor the institutional development TA consultant activities through inspection of progress reports and frequent meetings. As the consultant will be implementing numerous activities simultaneously, a schedule which explicitly identifies each major task and reporting deadlines will be crucial. Contractors will identify problems as they emerge and keep USAID informed of their status until they are resoleved.

The consultant will establish monitoring systems and conduct special studies to track progress in achieving the project's goal, purpose and outputs. These include tests of distribution system water quality and water wastage surveys.

The institutional development consultant will also establish an internal monitoring/evaluation system incorporating, but not limited to, information detailed under "Objectively Verifiable Indicators" and "Means of Verification" in Annex F: Log Frame. The consultant must make sure that data (i.e., water quality tests at plant sites) is being routinely and accurately collected and analysis of this data is being reported to both USAID and GOGCWS management. Detailed performance monitoring systems will be needed for the Operation and Maintenance, Purchasing and Inventory Departments. Within the Operation and Maintenance Department, particular attention should be given to leak detection and meter testing and repair for volume users because of the high economic rate of return for reducing water waste. These monitoring systems will assist the Training Department, GOGCWS management, the instituional development contractor, and USAID in identifying areas that need improvement and tracking progress in institutional development.

5.4 Evaluation of Twinning Program

After a twinning institution has been identified, an important initial task by GOGCWS, the U.S. utility, and the technical assistance contractor will be identification of ways the two institutions can work together, and how to evalute progress. As training is usually an important part of the twinning relationship, an evaluation system will assess whether personnel are using new skills. The technical assistance contractor and U.S. utility will work closely together to identify problems, fine tune training courses and assess whether the "twinning" relationship is achieving planned objectives.

5.5 Evauation Plan

The project will fund both interim and final evaluations. The interim evaluation will focus primarily on instititonal development, including the performance monitoring systems developed for each department, reporting systems for project goal and purpose key indicators, and contribution of the "twinning" relationship.

The Final Evaluation will review progress in institutional development and impact on benficiaries in the Rod El Farag service area. Baseline information on the water distribution systems and connections in these areas has been studied by CH2M-Hill during system design. Prior to the final evaluation team's arrival, USAID will contract with a local consulting firm for a survey of residents in the Rod El Farag service area to find out their perception of the effect of project sponsored improvements, including the revolving loan fund for connections, on water borne diseases, property values, pumping costs and their quality of life. The Final Evaluation Team will use this information as well as data collected by the project monitoring systems in assessing overall project impact on beneficiaries.

6.0 SUMMARIES OF ANALYSES

6.1 Technical Analysis

6.1.1 Identified Needs

The original Cairo Water Supply Project (263-0038) focused primarily on the rehabilitation and expansion of the Rod El Farag Water Treatment Plant. The full benefits of these improvements cannot be realized due to severe deficiencies in the existing transmission system and distribution network serving the north and central zones of Cairo Proper and the transmission system serving Nasr City.

Infrastructure deficiencies identified include inability of distribution network to handle increased operating pressures due to deteriorating pipes, restricted production at Rod El Farag Water Treatment Plant due to low operating pressure required to protect distribution network, lack of water to booster stations serving Nasr City due to low system operating pressure and hydraulic weakness of transmission lines to stations, ineffective storage reservoirs due to low system operating pressure and hydraulic weakness of lines to reservoirs, and undersized storage facilities.

Any improvements to the infrastructure will require concurrent improvements to the GOGCWS institution if the effective operation of the infrastructure is to be sustained. Training of staff has been identified as the main institutional weakness. Other major weaknesses include deficiencies in inventory management, lack of adequate maintenance facilities and equipment, insufficient water testing capabilities, and antiquated financial and accounting systems.

6.1.2 Basis of Technical Evaluation

A comprehensive Waterworks Master Plan prepared by ES-P was issued in 1979 which established a phased implementation plan for meeting the Year 2000 water requirements of the Greater Cairo area. The ES-P Initial Study for Upgrading Rod El Farag Service Area dated November 1983 identified those activities that would complement AID-financed improvements to the Rod El Farag Plant. The Sanyu Review of Master Plan dated February 1986 established an updated implementation plan for meeting the water requirements of the Greater Cairo area. These final two reports serve as the basis for the activities proposed under this Project.

It is important to note that the Rod El Farag service area does not have distinct boundaries. The Greater Cairo area water system is a complex system of interlocking distribution systems; the Cairo Proper service area receives water from four different treatment plants. Currently, the Rod El Farag plant is the main contributor to the central zone of Cairo Proper and meets a significant portion of the demand of the north zone, but a portion of its water is also diverted via booster pumps to the

adjacent Nasr City system. Not only do the boundaries of the Rod El Farag service area fluctuate during the course of a day, but significant changes can be anticipated between the current and the Year 2000 boundaries as new treatment facilities come on line. Computer simulations of the proposed Year 2000 water system indicate that the Rod El Farag plant will not deliver water to Nasr City by that time.

Accordingly, the Rod El Farag service area cannot be studied in isolation from the larger Cairo Proper system. Numerous complex computer analyses were performed as part of the previously mentioned studies; these analyses indicate that events in adjacent service areas will substantially impact the Rod El Farag service area. This project addresses those activities in the Rod El Farag service area which will be consistent with the phased implementation plan for the Greater Cairo area water facilities.

6.1.3 Evaluation of Technical Alternatives

6.1.3.1 Greater Cairo Alternatives

ES-P's 1979 Waterworks Master Plan and Samyu's 1986 Review of Master Plan both presented technical alternatives for the waterworks serving the Greater Cairo area. The alternatives presented dealt primarily with the siting and sizing of treatment facilities. Computer models were developed which compared various alternative piping schemes for the metropolitan area.

System operating pressures and projected water demands were also established as part of these studies. It was calculated that an operating head of 60 metres (77 metres above datum) at the Rod El Farag discharge pumps would be adequate to fill existing reservoirs in the service area to the typical fill line of 63 metres elevation and to provide sufficient water supply on the suction side of the booster stations serving Nasr City. The Year 2000 maximum day water demand for Cairo was projected to be 5.5 million m^3/d based on an average daily per capita demand of 480 litres and assuming maximum demand is 1.20 times average. Wastage and leakage do and would continue to account for approximately 50% of total water production.

6.1.3.2 Rod El Farag Alternatives

A number of technical alternatives were considered for the Rod El Farag service area in the ES-P 1983 Initial Study for Upgrading Rod El Farag Service Area and incorporated into the Samyu 1986 Review of Master Plan. Rod El Farag alternatives include:

- NO ACTION,
- INCREASE OPERATING PRESSURE IN SERVICE AREA,
- REDUCE WATER CONSUMPTION,
  - install water meters
  - flow restriction
  - consumer education

- REINFORCEMENT OF DISTRIBUTION NETWORK AND TRANSMISSION SYSTEM,
  - * increasing line sizes
  - * paralleling existing lines
  - * looping dead ends
  - * interconnecting lines at intersections
  - * replacing defective lines
  - * leak detection and repair of lines
  - * line cleaning
- ADDITIONAL STORAGE FACILITIES.

6.1.3.2.1 No Action

No action would result in the continued underutilization of the 800,000 m^3/d treatment facilities at Rod El Farag, continued shortages of water at the booster stations serving Nasr City, and uneven distribution of water within Cairo Proper due to inability to utilize the existing undersized storage facilities.

6.1.3.2.2 Increase Operating Pressure in Service Area

An increase in the operating head of the high service pumps at the Rod El Farag treatment plant would enable the plant to deliver approximately 200,000 to 250,000 m^3/d more finished water than the current 550,000 to 600,000 m^3/d. Such an increase would help alleviate, but not eliminate, problems with water distribution in those sections of Cairo Proper that are not near the Rod El Farag treatment plant by permitting greater utilization of the existing undersized storage facilities; it would also be necessary to provide additional storage facilities and to strengthen the transmission system delivering water to these facilities to fully correct distribution problems. Such an increase would also increase the periods of availability of water to the booster stations serving Nasr City; it would also be necessary to strengthen the transmission system delivering water to these facilities to ensure the continuous availability of water supply to the booster stations.

On the negative side, any increase in pressure would also surely result in an increase in water losses due to wastage and leakage. A past attempt to increase operating head resulted in the bursting of water mains. Due to the questionable quality of plumbing in the city, it can also be assumed that significant problems will be encountered by property owners in their indoor plumbing should the water system pressure be increased.

6.1.3.2.3 Reduce Water Consumption

Significant potential exists for the reduction of water consumption from present levels; consultants have estimated that approximately one-half of the water produced in Cairo is either lost in the distribution network or wasted by the consumer. The elimination of wastage could significantly reduce capital expenditures for new infrastructure and reduce operating costs. The major alternatives identified for reduction in water

consumption were: i) install water meters, ii) flow restriction, and iii) consumer education.

Water meters can be effective in conserving water if coupled with a rate schedule which assesses rates which are sufficiently high to discourage waste. Water meters require periodic calibration and overhaul, and personnel are required for reading meters and processing bills. Installation of water meters at connections for major users and the use of a flat rate for domestic users and small businesses is a compromise approach which can often be more cost-effective than metering all users.

The installation of flow restrictors at all public fountains and at residential connections could significantly reduce water consumption. Restriction of water usage would permit a more equitable distribution of available treated water. Major disadvantages of a flow restriction program include government opposition and potential hindrance of good hygiene.

Educating consumers to the implications of the wastage of water can sometimes be a low cost method of reducing consumption in modest amounts.

6.1.3.2.4 Reinforcement of Distribution Network and Transmission System

Computer analyses have been performed to identify weaknesses in the pipe network. In addition, records were reviewed to determine the age and condition of pipes and to identify major problem areas. The major alternatives identified for reinforcing the pipe network were: i) increasing line sizes, ii) paralleling existing lines, iii) looping dead ends, iv) interconnecting lines at intersections, v) replacing defective lines, vi) leak detection and repair of lines, and vii) line cleaning.

6.1.3.2.5 Additional Storage Facilities

Additional storage facilities could substantially improve the delivery of water to those consumers farthest from the treatment facilities, particularly during peak demand periods. Such facilities enable excess water produced during minimum demand periods to be stored at strategic locations in the system to supplement flows from treatment facilities at peak periods.

Storage facilities can only be effective in conjunction with other actions. Existing storage tanks do not fill due to the low system operating pressure, undersized mains, and the low production rate of the treatment plant.

Computer analyses have been performed to determine the most appropriate locations for storage tanks. Final selection of sites was based on a number of factors such as availability of land, topography, and aesthetics. On the basis of total annual cost, ground reservoirs were

favored over elevated tanks, even when companion booster stations were required due to topography. It is anticipated that the reservoirs will be of reinforced concrete construction, although alternative materials will be evaluated during the detailed design.

6.1.4 Proposed Actions

6.1.4.1 General

Evaluation of the various alternative actions for improving service in the Rod El Farag service area indicates that no one alternative can effectively improve service, rather a balanced program is necessary which includes an increase in system operating pressure, a reduction in water consumption, improvements in the pipe network, and additional storage facilities.

6.1.4.2 Operating Pressure

System operating pressure in the Rod El Farag service area will be increased in 2 to 3 metre increments to the 60-metre design operating head of the high service pumps at the treatment plant. A 12- to 15-month period is anticipated for the increase from the current 43 metres to the optimum 60 metres of head. This gradual increase will allow operation and maintenance personnel to identify leaks that develop and repair same before these leaks become significant problems.

6.1.4.3 Water Consumption

Under the proposed institutional development activities, a number of actions are proposed to reduce water consumption. New meters will be provided for approximately 20% of the largest consumers, a meter repair and testing program will be established for major users, a public awareness program will be conducted to sensitize the public to water waste, building regulations will incorporate more stringent plumbing standards, and government buildings will be retrofitted with new faucets and toilet valves.

6.1.4.4 Pipe Network

The project budget has been based on a "worst case" scenario in which approximately 20 kilometres of new transmission lines and 33 kilometres of new distribution lines will be installed. However, the design consultant will choose the optimum approach after a detailed analysis of the system. Looping the system and interconnecting lines has already been considered in computer analyses. In addition, leak detection and point repairs will be employed where appropriate and may reduce the amount of line to be replaced. Cleaning and lining of existing lines of 300 mm diameter and larger could prove to be significantly less costly than replacement of large segments of line. Consideration will be given to paralleling those lines which are structurally sound but hydraulically weak. Additional computer analyses will be performed to study the feasibility of using

dedicated pipelines to deliver water to areas of high demand and storage reservoirs.

6.1.4.5 Storage

Five ground level reservoirs with a total capacity of 120,000 m^3/d are proposed; three of the reservoirs will have companion booster stations. The total reservoir capacity in Cairo Proper will provide just under 6 hours storage at maximum day output from the recently expanded Rod El Farag Water Treatment Plant and 4 hours storage when the future GOGCWS expansion is completed at Rod El Farag. Booster stations will have capacity sufficient to meet peak hour demand, approximately 5,000 m^3/hr, with fifty percent standby capacity.

6.1.4.6 Institutional Development

In addition to those activities mentioned under "water consumption", a major institutional development program will address a number of weaknesses in GOGCWS. This will include staff training, purchasing and inventory management, studies aimed at system improvements, improved accounting and finanical management, improved maintenance facilities, equipment and management, twinning of GOGCWS with a U.S. utility, and a central research laboratory. These activities are all essential elements of a balanced program to ensure that maximum benefits are derived from the physical improvements to the water infrastructure completed under the first Project and proposed under this Project.

6.2 Economic Analysis

6.2.1 Introduction

Providing people access to adequate amounts of potable water, free of contamination, is assumed by most governments to be a necessary goal of municipal water supply systems. The question is not whether to provide water, but how to provide it, in what amounts, and how should costs be recovered.

As explained in the Technical Annex, more water could be provided to people in the area served by the Rod El Farag water treatment plant if the transmission and distribution system were upgraded and expanded. The major problems are water leakage, water wastage, insufficient transmission capacity, and low operating pressures. In spite of an investment of $98.7 million and LE 49.8 million to upgrade the water treatment plant at Rod El Farag, full benefit has not been achieved due to these inadequacies. Therefore, a major objective of this Project is to remove these constraints and thereby, provide an increased level of service to people in the central Cairo service area.

On the human side, the water utility (GOGCWS) requires organizational changes and upgrading of skills to enable it to respond to the ever-increasing demands for more water from the rapidly expanding population of Cairo. This institution-building activity recognizes that more than physical infrastructure is required if the utility is to operate efficiently. This Project will be directed at strengthening the GOGCWS through technical assistance and the provision of operational equipment.

Although costs can be estimated with some accuracy, it is not possible to estimate in a serious manner the pecuniary benefits related to reduced disease incidence and improved quality of life, which are major benefits of water supply projects.

6.2.2 Institutional Development

The Project will provide $29.8 million and LE 14.7 million (total USD equivalent is $35.1 million) worth of technical assistance and equipment to be used to strengthen the organizational capabilities of the GOGCWS in management, operations and maintenance.

This project component was examined using a discounted payback approach with constant 1987 dollars. The objective was to make a comparison of the size of the investment versus the utility budget in order to assess the appropriateness of the size of the investment.

The analysis demonstrated that the investment would pay for itself within a 14-year period for a targeted increase in efficiency of 10%. We expect that the Project so broadly impacts the GOGCWS that a 10% increase in efficiency is reasonable; furthermore, it is anticipated that the Project will have an impact for more than 14 years. Although this analysis was highly simplified, for example, the initial benefit and disbursement profiles have been ignored, we believe it is appropriate.

6.2.3 Water Wastage

Though water wastage is an element of the Institutional Development program, it was singled out for separate examination as part of the economic analysis due to its relative importance. Approximately 50% of the water produced at the treatment facility is wasted. Faulty house plumbing, particularly toilet float valves, and local attitudes are major factors responsible for this problem. More water would be available for consumption if less water were wasted. This would effectively increase the productive capacity of not only the distribution system but also the treatment plants.

The Project includes a public education program and technical assistance to help GOGCWS with this problem. The efforts made by the GOGCWS with USAID encouragement for tariff reforms should also have a positive impact

on water wastage. At present water is relatively cheap and unmetered. This does not lead to public support for conservation. A continued USAID presence in the sector should eventually result in higher tariffs, thus encouraging conservation.

It is useful to compare the magnitude of the project investment directed at this problem and the cost of water wasted. The cost to treat and distribute water including capital recovery is approximately 15 piasters per cubic meter, therefore, the cost of water per cubic meter of productively used water is 30 piasters at the estimated 50% wastage rate. If the program could cut wastage to the 40% level then the adjusted cost of water would be 25 piasters.

It is apparent that large economic benefits can be generated even with a small reduction in wastage. The Project intends to allocate approximately $1.1 million specifically for the water waste reduction program. Based on this investment, the payback period on a reduction from 50% to 48% wastage would be 70 days. Obviously, the rate of return is extraodinarily high. Therefore, the water wastage program should be viewed as an activity which should be expanded if preliminary results are positive. Lower wastage effectively increases the productive capacity of the entire system without capital investment in expanded capacity.

6.2.4 Infrastructure Upgrading

The Project will invest $62.9 million and LE 63.2 million (total USD equivalent is $85.8) to upgrade the Rod El Farag infrastructure. More storage and improved distribution and transmission of water will be provided. An updating of the Master Plan should ensure that the most cost-effective work will be executed for the benefit of Cairo's people.

The economic analysis studied both quantifiable and nonquantifiable benefits. Major benefits identified were:

- additional water for consumers
- reduction in network O&M costs through improved reliability
- reduction in costs associated with water related disease transmission
- reduction in water production and distribution costs due to reduced leakage
- reduction in pumping costs by property owners due to higher system pressure
- improved property values due to better water service
- improved quality of life due to better water service

6.3 Financial Analysis

6.3.1 Basis of Financial Analysis

Financial analyses are usually undertaken to ensure that an activity can be paid for and to determine the profitability of a project from the standpoint of the public or private entity for whose benefit a project is undertaken. The institutional development portion of this Project does not lend itself well to the types of analyses considered to be standard in financial assessments. Consequently, this analysis examines the demand for services (see Annex M, Training Assessment) and considers the best technical alternatives. Estimated recurrent costs for the training department were compared to estimated costs of continued low performance in the area of operation and maintenance.

6.3.2 GOGCWS Budget

The most important consideration in this analysis is the issue of financial viability, both in terms of the GOE's ability to meet recurrent costs and their willingness to revise tariffs to meet these costs. Budget submissions by MIC for GOGCWS are represented by the following figures for the Five Year Plan through 1992:

MIC SUBMISSION FOR GOGCWS

Fiscal Year	Amount (millions of LE)
1987/88	174
1988/89	140
1989/90	206
1990/91	189
1991/92	195
TOTAL	904

It is worth noting that the new planned allocations are significantly less than the amounts requested by GOGCWS. GOGCWS and C/GOSD requested funding of 1.2 billion LE in order to increase water production by 3.2 million m^3/d by the end of the planning period (1992). Although MIC is supporting the expansion and rehabilitation program, a recent assessment of the sector identified a potential shortfall of local currency funds.

The budgets prepared by GOGCWS do not conform to the accounting methods and formats used by either investor owned utilities or non-subsidized

public utilities. The GOGCWS budgets do not account for all costs incurred. In addition, the recording of revenues collected is lax due to the certainty of government subsidies to cover any cash shortfalls. This Project will establish a cost accounting and collection system which will allow GOGCWS to provide cost and revenue details on system specific balance sheets. GOGCWS will then be capable of preparing budgets which accurately reflect the needs of the utility.

6.3.3 Recurrent Operation and Maintenance Costs

The GOE/USAID January 1984 Memorandum of Understanding and a subsequent Ministerial Advisory set as a target 100% tariff coverage of O&M costs by 1991. Data provided by GOGCWS indicates that 62% of O&M costs were covered by tariffs in 1987. This ratio corresponds with the target computed for 1987 and is consistent with the MOU. On the other hand, the budget data presented is not totally reflective of the fiscal reality. Disbursements and actual revenues received tend to bear little relationship to the projection. An informal estimate at the time of the Fourth Annual Sector Review (July 1987) suggested that the actual coverage ratio was approximately 40%. A subsequent evaluation by JMM, submitted January 1988, indicates that GOGCWS has actually met the 1991 target. It is important to note that the probability of uncollectable revenue was not calculated in the JMM figures. The MOU is not specific with regard to how cost coverage should be calculated.

6.3.4 Tariffs

Previous reluctance to increase tariffs appears to stem from the belief of GOE officials that poor families lack the means to pay for services. As a result, the GOE has continued to subsidize all consumer groups. The scheduled tariff increases represented in Table 1.1 should give more balance to the subsidary program.

Unconnected families in the Rod El Farag service area are paying several pounds per month for waste removal plus water delivery charges to vendors. It is estimated that monthly charges for a non-subsidized system (LE 4 for a family of five) would be well within the income of a poverty level household. While many of the poor should be supported through subsidy programs, certain eligibility rules should be established.

A Working Paper for the Fourth Annual Sector Review concludes that the current subsidy program is not equitable. The program relies too much on external government transfers to cover deficits. Reliance on direct government transfers places the utilities at the mercy of macro austerity measures. The tendency to underfund O&M budgets restricts the utilities abilities with regard to improvements in service and expansion of service areas. Typically, it is the poorer areas that are denied the benefits of an expanded service area.

Under this project, the institutional development contractor will work with the GOGCWS Finance Department to identify and evaluate alternative revenue sources, i.e. connections, meter repair, etc. and tariff structures that will increase revenues fairly and take into account ability to pay. Implementation of the revolving loan fund can cushion the effect of higher charges for household connections by allowing low income houses to amortize charges for household connections by allowing low income houses to amortize charges.

6.4 Institutional and Administrative Analysis

6.4.1 History

GOGCWS's predecessor was established by a French company in 1865. The Organization later became an Egyptian joint-stock company. In January 1957, it was transformed by Presidential decree into a public institution, the Cairo Water Utility Administration, belonging to the Cairo Municipality. Another presidential decree in 1968 established the utility in its present form and name, the General Organization for Greater Cairo Water Supply.

6.4.2 Organization

The GOGCWS has the responsibility for the potable and non-potable water supply systems serving the Greater Cairo area with a mandate to anticipate demand requirements, plan new projects, oversee design, and supervise construction. The powers of the Organization lie in the Board of Directors, the administrative decisions of which are subject to review by the Governor of Cairo. Financial planning for operation and capital budgets is submitted to the Ministry of Housing and Reconstruction for review and then to the Ministry of Finance for final authorization.

6.4.3 Staffing

Annex J examines the functioning of 10,534 GOGCWS employees in their professional categories: engineers (297); scientists (61), finance and accounting (270), lawyers (26), administrative (76), social services/public relations (19), security (21), engineering technicians (612), laboratory technicians (59), clerical (1,956), semi-skilled laborers/craftsmen (4,052), unskilled laborers/helpers (3,085). GOGCWS authorized strength is currently 26 top management positions and 10,931 lower-echelon positions. Currently, only 18 of the top management positions are filled.

6.4.4 Current Organizational Assessment of GOGCWS

The analysis examines recent organizational analyses of the GOGCWS institution and adds to the findings of these studies the experience of the GOGCWS in working with USAID on the Cairo Water Supply I Project. All parties are in agreement that there is a serious waste of valuable talent and skill in the Organization due to untutored management and insufficient training throughout the utility. Past attempts to strengthen the institution appear not to have had significant impact; as a result, redundancy is still substituted for competence. Analysis indicates that upper level management wants this to change and is anxious to initiate a training program which will work to that end. This Project proposes, and the Administrative/Institutional Analysis supports, a comprehensive training program to be implemented by the GOGCWS, itself, through a newly constituted Training Department. The description of this program has been thoroughly outlined previously in the Project Description and in the Implementation Plan. (A complete description of this element can be found in Annex M, Training Annex.) This developmental approach differs from the ad hoc technical training done by donors and GOGCWS to date.

Likewise, AID's experience casts doubt on the concept that significant management changes will be brought about through the use of expatriate teams. In light of the fact that USAID is convinced that GOGCWS management is cognizant of a need to improve their management system, thought has been given to how to bring about those improvements through direct interaction of these managers with their U.S. peers. In the past, it has been noted that technical assistance consultants were resented for the emphasis ordinarily given to paper analysis rather than practical advice. Also, small teams of consultants dropped into the working offices of a large utility remain relatively isolated, in large part because they are not, by experience, working utility managers. In contrast, those GOGCWS managers exposed to observational tours have returned from the United States motivated and advocating change in operating systems. However, short tours, no matter how well-focused, have drawbacks. The most important of these limitations are that the participants are few in number and find little support from their colleagues upon their return. There is no continuing support or advice from the visited organization; consequently, participants become discouraged and good ideas remain unexecuted. It seems appropriate to establish an alternative approach to the technical consultant path and the observational training method. This Project, through the twinning of institutions, will shift the initiative for promoting sensitive organizational and management changes to the managers of GOGCWS. It will provide them with a source of support with other managers from a similar utility.

Previous analysis identified areas in which discrete inputs would have immediate results in improved systems. One such problem area is in the inventorying of spare parts. GOGCWS has parts stored in an informal fashion throughout its service area. Some of these parts are over 50 years old and the variety of makes and types are numerous, yet they have no central inventory or coding system. This has resulted in duplication of procurements and long delays, when in fact the part is on hand, and general frustration with parts supply. The James M. Montgomery (JMM) contract under Cairo Water Supply I has begun to address this problem by instituting a model inventory and warehousing system. The institutional development component of the Cairo Water Supply II Project will support the continued efficiency of the new system. Another obvious problem area at GOGCWS is the present billing and accounting system. Through JMM's pre-implementation activities, identification of specific automation needs will be made and these needs will be addressed under this Project.

In the area of operation and maintenance, it was noted that a major failure in the current on-the-job training for semi-skilled and unskilled maintenance workers is that bad work habits are passed on simply because proper tools are not available. A number of preventative maintenance tasks are either deferred or not performed at all due to a lack of appropriate equipment. The tools provided by this Project, in conjunction with appropriate training activities, should have a major impact on the performance and morale of network maintenance employees.

6.5 Environmental Analysis

6.5.1 Background

The 1979 Waterworks Master Plan for Greater Cairo included an environmental analysis. That analysis pointed out the need to maintain parallel water and wastewater activities in order to avoid overloading inadequate wastewater collection facilities as the availability of potable water increased.

6.5.2 Anticipated Benefits

Anticipated benefits to be derived from the improvements to the Rod El Farag distribution network and transmission system include protection of public health through provision of a continuous supply of safe water.

6.5.3 Environmental Issues

The major environmental concern regarding the Project will be the change in water usage patterns in Cairo Proper and the resultant impact of this increased usage on wastewater facilities. A secondary concern is the potential for increasing the already high wastage and leakage losses as system pressures are increased.

6.5.4 Recommended Environmental Plan of Action

The Project requires the preparation of an Environmental Assessment under the provisions of 22 CFR 216, "AID Environmental Procedures". The Environmental Assessment will be prepared as an element of the technical design of the Project. The Assessment will address those issues identified herein as well as any other significant issues that may be identified as a result of the scoping session to be held in Cairo.

The Assessment will review the proposed actions as well as alternatives to the proposed actions, and identify cost-effective and implementable mitigation actions. The assessments will also review the environmental reliability of proposed interventions under Egyptian conditions.

The assessment will be submitted to the ANE Bureau Environmental Coordinator for review and approval prior to the release of IFBs for construction activities.

General indications are that the overall impact of the Project upon the environment will be positive. Project design has placed strong emphasis on the selection of environmentally sound alternatives.

6.5.5 Environmental Clearances

AID Environmental Procedures require that an Environmental Assessment or Environmental Impact Statement, as appropriate, be prepared for all water and wastewater projects. An environmental assessment will be prepared by CH2M-HILL as an element of the design study now underway. The Bureau Environmental Coordinator is responsible for the review and clearance of Environmental Assessments even when, as in this case, project approval authority is delegated to the field.

The ANE Bureau Environmental Coordinator has concurred with the concept of approving the Project Paper and signing the Project Agreement prior to the completion of the Environmental Assessments.

6.6 Social Analysis

Under the Cairo Water Supply II Project, two discrete types of activities are proposed. The major activity will be to install 53 km of new transmission and distribution pipe and to construct five new reservoirs. Direct beneficiaries of the infrastructure component will be the inhabitants of the 15 districts (Kisms) composing the Rod El Farag distribution system (approximately 2 million persons). The remainder of the Project, will concentrate on building the GOGCWS ability to manage and maintain the entire Cairo network; as a consequence, all the water consumers in Greater Cairo can be seen as secondary beneficiaries (approximately 10 to 12 million).

Institution building, recognized as a slowly accruing process, will not be as visible as upgrading of the network in the Rod El Farag area. The inhabitants of the upgraded districts will be the first beneficiaries of Cairo Water II. In no other part of Cairo can one find the economic and cultural diversity that is present in this service area. The kism of Rod El Farag (not to be confused with the service area of the same name) has the highest population density in the city and the second highest in the country. ? so in the north, Sahel, Sharabia, and Soubra kisms have had some of the highest growth rates in Cairo over the past decade. Central Cairo contains the city's popular commercial areas. The Kasr El Nil Kism is the home of major hotels and the center of Egypt's tourist trade; it is also rapidly becoming the major banking and business district for the city and for the country as a whole. Abdine District is the official headquarters of the State and contains the Presidential Palace. In contrast, Sayeda Zeinab is one of the oldest sections of the city and is composed of a very low income population. The Rod El Farag area also services the oldest quarters of the city and various historical sights important to Coptic, Egyptian, and Jewish history.

Of the 2 million inhabitants of the service area, those who stand to gain the most benefit are the many inhabitants (estimated at 40,000 to 50,000) who are not connected to city water presently. These are among the poorest of the urban poor.

In general, most USAID-funded infrastructure projects have addressed the large price tag components, leaving the lateral distribution lines and household hookup components to the host government. An exception to this trend was Cairo Supply I in which 40,000 disadvantaged households were to be connected. After a detailed study of the project's metered hookup component, under which low income households were to be connected, this part of the project was dropped. It was decided that metering in the poorest section of the city, while charging a flat rate elsewhere was not feasible. The immediate practical result of this decision was that the most disadvantaged people still are not connected to a safe, reliable water supply. It was clearly the intent of the GOE and USAID, however, that these connections would become a reality after further study.

Sector lessons learned since the authorization of Cairo Water I bear upon the approach Cairo Water Supply II will take toward the unconnected areas. The new mains and distribution pipes will make household connections available to the unwatered areas and hence the landlords and homeowners will not be responsible for sharing the cost of the distribution line as well as the connection costs. GOGCWS has developed a system in which the dwelling owner may pay the cost of connection by installments; a 1980 study shows that they are willing and able to handle this expenditure if the water is available through distribution pipes nearby. Piped water is the preferred source and the disadvantaged of the area are presently paying high costs, either in time waiting at public fountains or in piasters to a local vendor, for access to it.

The adoption of new tariffs and a new policy for metering will insure that the cost of operation and maintenance will be passed on to the major users and those most able to support the system.

In conclusion, the analysis shows that the proposed Project will have several direct and indirect benefits for the population of Cairo. There will be more water and increased water pressure available to a significant portion of Cairo's population. "More water" will have many benefits to individuals and families, not the least of which are its implications towards improvement in health and safety standards by reduction in the potential for the transmission of water-borne diseases and by providing greater safety against fires. There will be an overall savings in terms of energy now used by commercial establishments to increase water pressure. The presence of water for servicing public midans, parks, and tourists establishments will greatly enhance the few open spaces in central Cairo and thus benefit commerce as well as inhabitants. Finally, new tariffs, the new metering policy, and the availability of distribution lines to the poorer districts of the Rod El Farag service area, will introduce a more equitable and safe supply of water to its disadvantaged inhabitants.

7.0 COVENANTS AND CONDITIONS PRECEDENT

7.1 First Disbursement

Prior to any disbursement or to the issuance of any commitment documents under the Grant, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

- A statement of the names and titles of the persons who will act as representatives of the Cooperating Country under the Grant, together with a specimen signature of each person specified in such statement;

- A statement, with appropriate supporting detail, to the effect that adequate staff, physical facilities and financial resources either have been, or on a timely basis will be, made available to the GOGCWS to carry out its Project-related implementation responsibilities.

- Evidence that a new training department has been established within GOGCWS; that such department has been fully staffed; and that such department has an appropriate degree of autonomy to expedite, plan and implement training and planning of training.

7.2 Disbursements for Construction Activity - General

Prior to any disbursement or to the issuance of any commitment documents under the Grant for the purpose of financing construction activity, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.

- Evidence of the Cooperating Country's intention and planning both (i) to increase tariffs, over time, not only to cover 100% of operation and maintenance costs but to cover also the recurrent costs associated with Project financed facilities and (b) during the interim, to cover deficits through additions to the recurring cost budgets of the GOGCWS.

- Evidence of agreement on a qualified U.S. engineering firm which is under direct contract with A.I.D. to provide construction supervision services and that such contract provides the firm with the authority of the engineer as described in standard FIDIC terms ("Conditions of Contract for Works of Civil Engineering Construction", published by the Federation International des Ingenieurs Conseils (FIDIC); 3rd Edition, March 1977).

7.3 Disbursement for Individual Construction Contracts

Prior to any disbursement or to the issuance of any commitment documents under the Grant for the purpose of financing individual construction contracts, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

- Evidence that clear title to all land necessary to construct and operate such individual facility has been obtained or will be obtained on a timely basis;

- Evidence that an Environmental Assessment has been completed for such individual facility, together with the Cooperating Country's statement as to how the results of that Assessment will be incorporated into final design of such facility; and

- Confirmation that adequate Egyptian pound resources will be available, according to then current estimates, to meet the local currency costs of each such contract within the Cooperating Country's contribution to the Project.

- A copy of an executed contract for such services which inter alia shall call for provisional sums arrangments acceptable to A.I.D.

7.4 Covenants

The Grant Agreement will contain in substance the following covenants:

7.4.1 Provisional Sums

Construction contracts financed under the Project shall call for provisional sum arrangements acceptable to A.I.D.

7.4.2 Social Insurance

Egyptian social insurance premiums, and Egyptian taxes on any non-Egyptians, assessable on any construction contracts financed under the Project shall be cost-reimbursable expenditures to each such contractor and shall be payable within the Cooperating Country's contribution to the Project.

7.4.3 Financing Mechanism

The financial contributions of the Cooperating Country to the local currency costs of construction contracts shall be met through use of Egyptian pound letters of credit.

7.4.4 Household Water/Sewerage Connections

The Cooperating Country will exert its best efforts, over time, through the use of its own resources, to expand the water distribution systems to the disadvantaged neighborhoods within the Project area. In doing so the Cooperating Country will coordinate with C/GOSD to insure that these areas have adequate sewerage to carry off wastewater. It is envisioned that these best efforts will include the use of LE 2.5 million of special account funds for establishing a revolving fund for loans to homeowners for the purpose of financing connections to both the public sewers and the public water mains.

7.4.5 Exemption from Decennial Liability

Contractors, architects, consultants and subcontractors, regardless of nationality, working on the Project shall be exempt from the provisions of the Egyptian civil code imposing decennial liability.

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PROJECT AUTHORIZATION

Name of Country: Arab Republic of Egypt

Name of Project: Cairo Water Supply II

Number of Project: 263-0193

1. Pursuant to Part II, Chapter 4, Section 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Cairo Water Supply II Project for the Arab Republic of Egypt (the "Cooperating Country") involving planned obligations of not to exceed $104 million in grant funds over a three year period in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Project is 5 years from the date of initial obligation.

2. The Project consists of assistance to the Cooperating Country to improve and promote proper management and supply of water for Cairo. The Project's purposes, more specifically, are (a) to rehabilitate and expand Cairo's central city water transmission and distribution facilities and (b) to strengthen Egyptian institutional capacity to operate and maintain the entire water supply system of Cairo.

3. The Project Agreement, which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

4. Source and Origin of Commodities, Nationality of Services

A. Commodities financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, suppliers of commodities or services shall have the Cooperating Country or the United States as their place of nationality, except as A.I.D. may otherwise agree in writing.

B. Ocean and air shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed only on flag vessels and carriers of the United States.

5. Conditions Precedent to Disbursement:

A. First Disbursement: Prior to the first disbursement under the Grant or to the issuance by A.I.D. of documentation pursuant to which disbursement will made, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(i) A statement of the names of the persons acting on behalf of the Cooperating Country as specified in the Grant Agreement and of any additional representatives, together with a specimen signature of each person specified in such statement;

(ii)A statement, with appropriate supporting detail, to the effect that adequate staff, physical facilities and financial resources either have been, or on a timely basis will be, made available to the General Organization for Greater Cairo Water Supply (GOGCWS) to carry out its Project-related implementation responsibilities.

(iii)Evidence that a Training Department has been established within GOGCWS; that appropriate plans exist to staff the Department; and that the Department has an appropriate degree of autonomy to expedite, plan and implement training.

B. Disbursements for Construction Activity - General: Prior to any disbursement or to the issuance of any commitment documents under the Grant for the purpose of financing construction activity, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D, in form and substance satisfactory to A.I.D:

(i) Evidence of the Cooperating Country's intention and planning both (i) to increase tariffs, over time, not only to cover 100% of operation and maintenance costs but to cover also the recurrent costs associated with Project financed facilities and (b) during the interim, to cover deficits through additions to the recurring cost budgets of the GOGCWS.

(ii) Evidence of agreement for A.I.D. to contract directly with a U.S. engineering firm to provide construction supervision services on terms which inter alia provide the firm with the authority of the Engineer as described in standard FIDIC terms 1/.

C. Disbursement for Individual Construction Contracts: Prior to any disbursement or to the issuance of any commitment documents under the Grant for the purpose of financing individual construction contracts, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

1/ "Conditions of Contract for Works of Civil Engineering Construction", published by the Federation International des Ingenieurs Conseils (FIDIC).

(i) Evidence that clear title to all land necessary to construct and operate such individual facility has been obtained or will be obtained on a timely basis;

(ii) Evidence that an Environmental Assessment has been completed for each facility, together with the Cooperating Country's statement as to how the results of that Assessment will be incorporated into final design of such facility;

(iii) Confirmation that adequate Egyptian pound (L.E.) resources will be available, according to then current estimates, to meet the local currency costs of each such contract within the Cooperating Country's contribution to the Project; and

(iv) A copy of an executed contract for such services which inter alia shall call for provisional sum arrangements acceptable to A.I.D.

6. Covenants:

The Project Agreement shall contain, in addition to the standard general covenants, covenants in substance as follows:

A. The Parties agree to meet at least annually to review performance under the Project during the previous year and anticipated performance during the following year. The reviews will include evaluation of funding for the project, construction implementation, institutional development, and progress being achieved toward the objectives set forth in the Memorandum of Understanding (MOU) of January 1984.

B. The financial contributions of the Cooperating Country to the local currency costs of construction contracts shall be met through use of L.E. letters of credit.

C. The Cooperating Country will exert its best efforts, over time, through the use of its own resources, to expand the water distribution systems to the disadvantaged neighborhoods within the Project area.

D. Contractors, architects, consultants and subcontractors, regardless of nationality, working on the Project shall be exempt from the provisions of the Egyptian civil code imposing decennial liability.

E. Neither Grant funds nor Special Account funds may be used to pay salary supplements to Cooperating Country personnel except pursuant to mutually agreed criteria.

F. Egyptian social insurance premiums, and Egyptian taxes on third-country expatriates, assessed with respect to any construction contracts financed under the Project shall be cost-reimbursable expenditures to each such contractor and shall be payable within the Cooperating Country's contribution to the Project.

Marshall D. Brown
Director
USAID/Egypt

Sep 25/1988
Date

ANNEX F

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Sector Goal	**Measures of Goal Achievement**		
Improve sanitation and health conditions for the 12-14 million people living and/or working in Greater Cairo.	a. Improved water quality b. Increased quantity of water to more consumers.	- Monitoring of water quality at plants. - Special studies testing distribution system water quality. - GOGCWS production records. - Leak detection/meter testing records. - Water wasteage surveys/studies. - GOGCWS records on connections.	Improved quality and quantity of potable water will result in improved sanitary conditions and health. Correlation between health and sanitation and water is extremely difficult to prove, especially given other USAID health projects.
Project Purpose	**Conditions**		
1. Expand central city water transmission and distribution capacity.	a. Rod el Farag plant operating at full capacity. b. Expansion to currently unserviced areas and new commercial buildings.	GOGCWS plant production records. GOGCWS connection records.	Rehabilitation of network will be completed as scheduled.
2. Strengthen GOGCWS institutional capacity to operate and maintain entire Cairo water supply system.	Increased efficiency: production/revenue ratios; labor cost/production ratio; reduced inventory overhead.		GOGCWS management will continue to recognize need for organizational changes and accept consultant advice and assistance.
Outputs			
1. Infrastructure: a. Rehabilitated central district water distribution network b. New meters to volume customers. c. Increased connections.	a. Net capacity increase of 450,000 m2. b. # of customers with functioning meters. c. Increased service to commercial and low income customers.	a. Rog El Farag records. b. Meter inspection and repair reports. c. COGCWS records on connections & loan records.	All contractors will preform as stinpulated in contract. GOGCWS executrives and staff participate actively in all aspects of organization support and technical systems improvement program.
2. GOGCWS institutional improvements in the following areas: a. Modern centralized laboratory to monitor water quality and conduct studies to improve processes. b. Modern accounting and finance departments improving collections, estimating service costs, system efficiency and financial analysis. c. Purchasing and inventory management tracking stocks and reordering as needed. d. Maintenance facilities and upgrade e. Distribution network operations and maintenance. f. Training Department.	a. Improved water quality. Recommendations to improve water treatment processes. b. Faster, increased collection of revenue, better estimates of actual cost of service, and tracking efficiency. c. Workers have necessary equipment, spares and tools. Reduced duplication and overhead. d. More functioning equipment. Meter testing and repair services testing all volume e. Faster complaint resolution, increased routine O & M, reduced water waste/leakage. f. # of courses, # & type of trainees, improved performance by trainees.	a. Water quality monitoring reports, filtration studies, & water quality testing of distribution system. b. GOGCWS records on meter readings, billings, and collections. c. Baseline reports, evaluation of inventory lists, performance monitoring system reports. d. GOGCWS Records, Supervisors' and performance monitoring reports, Leak detection reports, water waste studies. e. Training Department records, needs assessments, performance monitoring system reports.	
Inputs			
1. Network Upgrading 2. Institutional Development 3. Project Contingency 4. Audit and Evaluation	USAID ($ 000) FX / LC 62,900 / 500 29,200 / 5,200 4,600 / 300 300 / -- 97,600 / 6,100	GOE (LE 000) LE -- -- 1,100 -- 23,500	1. Grant Agreement 2. Contract Documentation 3. USAID Financial Accounts 4. Audits	1. Condition Precedent/Covenants are met. 2. Foreign exchange and local currency are available as budgeted.

Best Available Document

ANNEX D

CERTIFICATION PURSUANT TO SECTION
611(e) OF FAA 1961 AS AMENDED

I, Marshall D. Brown, Director, the principal Officer of the Agency for International Development in Egypt, having taken into account, among other things, the maintenance and utilization of projects in Egypt previously financed or assisted by the United States, do hereby certify that in may judgment Egypt has both the financial capability and the human resources to effectively install, maintain and utilize the capital assistance to be provided by the Cairo Water Supply II Project.

This judgment is based upon general consideration discussed in the capital assistance paper to which this certification is to be attached.

Director

9/25/88
Date

ANNEX D

CERTIFICATION PURSUANT TO
GRAY AMENDMENT

As Director and Principal Officer of the Agency for International Development in Egypt, I certify that full consideration has been given to the potential involvement of small and/or economically and socially disadvantaged enterprises, historically black colleges and universities and minority controlled private and voluntary organizations covered by the Gray Amendment.

The project procurement plan is based on the need to utilize contractors with specific substantial knowledge and technical competence as discussed in the Project Paper to which this certification is attached. The necessary knowledge and expertise is not available, to the best of our knowledge, from minority and women-owned firms, historically black colleges and universities and minority controlled private voluntary agencies.

Director

9/25/88
Date