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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL DEVELOPMENT ASSOCIATION

APPRAISAL OF THE

NICOSIA SEWERAGE PROJECT

CYPRUS

March 9, 1971

Public Utilities Projects Department

CURRENCY EQUIVALENTS

Currency unit	-	Cyprus Pound (£C) = 1000 mils
US$1	-	£C0.417
£C1	-	US$2.40
£C1 million	-	US$2.40 million

ABBREVIATIONS

gal	-	Imperial gallon (1 gallon = 1.2 US gallons or 4.5 liters)
m^3	-	cubic meter (220 Imperial gallons or 264 US gallons)
Imgd	-	million Imperial gallons per day (4544 m^3/day)
mg/l	-	milligrams per liter
in	-	inch (25.4 millimeters)
ft	-	foot (0.3048 meters)
mi	-	mile (1.609 kilometers)

ACRONYMS

DWD	-	Department of Water Development
WHO	-	World Health Organization
UNDP	-	United Nations Development Program

FISCAL YEAR

January 1 - December 31

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NICOSIA SEWERAGE PROJECT

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APPRAISAL OF THE NICOSIA SEWERAGE PROJECT

SUMMARY AND CONCLUSIONS

i. This report covers the appraisal of a sewerage project in Nicosia for which a Bank loan of US$3.5 million equivalent is proposed. A second loan of US$1.9 million for sewerage in Famagusta, to be considered concurrently with this loan, is discussed in a separate report. The project, which together with that of Famagusta would constitute the first public sewer systems in Cyprus, is required to improve the environment of the capital city by eliminating potential health hazards and to reduce the growing expense of septic tank maintenance. The proposed reuse of the treated waste water for irrigation would be an additional benefit of the project.

ii. The project would be the first stage of a Master Plan of sewers for the capital city, serving initially some 32,000 of the city's 118,000 residents. The project area of 1,060 acres in south central Nicosia is that part of the city where the need of a sewer system is greatest because of population density and where present disposal methods are creating the greatest problem. The project includes some 16 miles of connecting sewers, and some 53 miles of lateral, sub-trunk and main sewers through which sewage will flow by gravity to the treatment site. It also includes construction of a relatively inexpensive treatment facility which should provide an effluent suitable for use in irrigation or for disposal to the Pedios River. Construction of facilities to use the water for irrigation is not part of the project, but would be done by irrigation interests after studies of the waste water quality and methods of use are completed by the Department of Agriculture.

iii. A portion of the project area lies within the walls of the old city of Nicosia, where an archaic water supply system is to be reconstructed concurrently with the installation of sewers. The consultant has redesigned the water system to permit the necessary work to take place at the same time as the laying of the sewers in order to save costs. The water system improvements will be made by the local water authority, with financial assistance from the Government.

iv. Because of the political situation, there may be difficulty in reconstructing the water system or in laying the sewers in the 60 acres of the project area lying within the Turkish sector. If it should prove impossible to execute this part, which would only amount to about 3% of the project cost, other parts of the project will not be affected; the portion in the Turkish sector could be postponed until after a general political settlement is reached.

v. The financial requirements of the project (exclusive of funds required to finance loans for connections) total US$6.8 million equivalent, of which US$3.5 million will be met by the proposed Bank loan. The loan will cover the foreign exchange requirements for engineering and construction totalling US$3.0 million, of which US$0.1 million represents retroactive financing of detailed engineering costs incurred since July 1, 1969, together with US$0.5 million for interest during construction on the Bank loan. The local currency requirement would be US$3.3 million. Included in this sum of US$3.3 million are US$0.2 million for preliminary construction carried out in 1970 and engineering costs paid before July 1, 1969.

vi. The Borrower would be the Sewage Board of Nicosia (hereinafter referred to as the Board), which was created under appropriate legislation in January 1971. The Municipal Engineer has been appointed as the Chief Engineer of the Board and this is acceptable. The Accountant/Administrator will be appointed not later than October 1, 1971. Appointments to these positions will be made only after the Bank has had an opportunity to comment on the proposed appointee.

vii. The Board has no initial revenues and the project requirements would be 100% debt financed. The Bank loan, covering foreign exchange construction costs and interest during construction on the Bank loan would provide about 50% of financial requirements, and the Board would sell bonds on the local market for most of the required local currency, including funds to provide loans to householders for financing connection costs in cases where the house holder cannot afford to make payment in cash. These bonds would be guaranteed by the Government, which would also provide a loan of US$0.48 million equivalent for working capital. The interest rate of the bonds will be between 7-1/4 and 7-1/2% (depending upon market conditions at the time of issue) and the term 12 years. The Board would set up a sinking fund to redeem 50% of the bonds at maturity and the Government will guarantee the refinancing of the remainder of the bonds for a further 12 years.

viii. The future expenses of the Board would be predominantly debt service. Sewer service charges would be based on water meter readings and on the assessed value of properties. Assessment on properties would be made both within the present project area and in areas to be served at a later date. The mil rate charged in the areas outside the present project area would be approximately one-third of the rate to be charged within the project area. Revenues are expected to grow steadily as a result of increasing property assessments and water sales. Together with receipts from sale of treated waste water for irrigation, there would be surpluses after the initial years of operation with constant price and tariff levels. Future surpluses would be used for minor extensions to the system.

ix. The internal financial return on the project is about 12%.

x. The project is suitable for a Bank loan of US$3.5 million, for a term of 25 years including a grace period of approximately 4 years.

CYPRUS

APPRAISAL OF THE NICOSIA SEWERAGE PROJECT

I. INTRODUCTION

1.01 The Government of Cyprus has requested a Bank loan to help finance a sewerage project in Nicosia. Nicosia, the capital of the Republic, has a metropolitan population of 118,000 (1970) increasing at about 2.7% per year. The project would serve about 32,000 people in south central Nicosia. The total financial requirements, excluding loan funds for financing private connections, are estimated to be US$6.8 million equivalent, consisting of construction costs of US$6.3 million and interest during construction on the Bank loan of US$0.5 million. A Bank loan of US$3.5 million equivalent is proposed to finance the foreign exchange construction costs of US$3.0 million and interest during construction on the Bank loan.

1.02 There is no public sewerage system in Cyprus, although the need has long been recognized. A report prepared for the Government in 1959 recommended a sewerage system for Nicosia, but no action was taken because of the political situation at the time. Following independence, the Government requested the World Health Organization (WHO) to study and report on sewerage on the island. The WHO report in 1965-66 recommended that sewerage systems be built in Nicosia and Famagusta. The report further recommended that consulting engineers be employed to draw up Master Plans and early stage plans for sewerage in the two cities. As a result, the Government included sewerage for Nicosia and Famagusta in the Second Five-Year Plan (1967-71) of the Republic. In early 1968, the Municipal Corporation of Nicosia, with Government approval, retained MacLaren International Limited of Toronto, to make a comprehensive study of the sewerage needs of Greater Nicosia. The MacLaren report includes a Master Plan of sewers looking ahead for 50 years, and more detailed plans, estimates and feasibility studies for the first three stages of the Master Plan. It recommended that the first stage be constructed immediately, followed by a second and third stage to be constructed in the first decade.

1.03 The proposed project is the first stage of the Master Plan recommended by MacLaren. It includes a complete sewage collection system for the highest priority area of the city, the trunk mains leading to the treatment site and the first stage treatment facility.

1.04 A Bank pre-appraisal mission visited Cyprus in February 1969 and recommended the project for further consideration. Certain of the design standards were subsequently reviewed and amended to lower costs by reducing sewer slopes, and therefore sewer depths, and by reducing the diameters of the trunk sewers.

1.05 This report is based on information furnished by the Government of Cyprus, the Municipality of Nicosia, the consultants' reports and on field investigation by a Bank appraisal mission of January 9 - February 7, 1970 composed of Messrs. R. Bowering, B. Grover and R. Smith.

II. THE SECTOR

A. Relation to Economy

2.01 Cyprus, with an area of 3,750 square miles, is the third largest island in the Mediterranean. It has a typical Mediterranean climate with hot, dry summers and variable winters with an average annual rainfall of about 40 inches in the mountains and 12 to 18 inches in the plains. There are no rivers with a perennial flow of water.

2.02 The total population is about 630,000 of whom nearly 500,000 belong to the Greek community, the remainder to the Turkish community. The 1960 Constitution provided for division of governmental posts between the two communities but certain aspects of the Constitution have been the cause of dispute and the two national groups are now generally separated on a de facto basis.

2.03 Notwithstanding this problem, growth in GNP has averaged nearly 7% per annum over the period 1962-67 and average per capita income is now around US$830 per annum. Tourism has grown particularly rapidly and tourist expenditures amounted to nearly US$19 million equivalent in 1969, which compares with earnings from commodity exports of some US$95 million.

2.04 The dominant activity in Cyprus is agriculture and exports in this category increased by more than 50% over the period 1962-67. Agricultural activity is more restricted by lack of water than lack of land and yields from irrigated areas are some eight times greater than those from dry-farmed areas. Irrigation projects receive financial support from the Government and the treated waste water from the proposed sewerage project will increase water available for irrigation purposes.

2.05 Nicosia, the capital city is also the main administrative and commercial centre with a population in excess of 118,000. During the next decade it is estimated that population growth will be about 2.7% per annum, compared with an estimated 1.1% per annum, for the island as a whole, reflecting a trend to urbanization. The island's international airport is located near the city so that Nicosia is also the main arrival and departure point for tourists.

B. Water Supply and Water Resources

2.06 Water is in short supply in Cyprus, with most of the water sources, mainly groundwater, now approaching maximum development. Because of the absence of sewer systems in Cyprus, no facility exists whereby waste water can be collected, treated, and re-used for irrigation or groundwater recharge to help alleviate the water shortage. Annex 1 describes the water resources and water supply situation in Cyprus and the water organization in Nicosia. The water systems for Nicosia are well run and have thus far been able to keep abreast of steadily increasing demand.

C. The Present Sewerage Situation

2.07 Although most homes and buildings of the major towns of Cyprus are now equipped with modern plumbing, sewage is still disposed of privately through septic tanks and absorption pits. This arrangement is satisfactory as long as the number of homes and buildings is limited and the soil is porous. With the increasing number of plumbing systems in urban areas with non-porous clay soil, nuisances to sight and smell and health hazards have grown and the cost of pumping and trucking septic effluent has increased proportionally. In Nicosia, private firms, the Government and the Municipality use 16 tank trucks for removing septic effluent at a cost of some £C90,000 per year. The areas in Nicosia with the most serious problems are those within the walls of the old city and in the clay area south of the walls. In these areas, only the construction of a public sewer system will permit a permanent and satisfactory solution to the sewerage problem.

III. THE BORROWER

3.01 The Borrower would be a new agency, the Sewage Board of Nicosia (the Board). The legislation enabling creation of the Board and other similar Boards where required, was passed in January 1971. This legislation provides that where the Board's area includes a municipality the Board shall consist of the Mayor as Chairman and all members of the Municipal Council, and where the area extends beyond municipal boundaries, as in the case of Nicosia, additional representation on the Board could come from outside areas. A permanent chief executive officer responsible for day to day administration under the general policy guidance of the Board will be appointed. Provision is made for the appointment of municipal staff to work part-time for the Board.

3.02 The legislation is sound, and covers the general powers and duties of a Sewage Board. The Board has the right to acquire compulsorily land and rights-of-way, to borrow and issue securities, and to control

the type of wastes permitted to enter the sewers. The Board is empowered to require owners of buildings with piped water supply to connect to the sewers and to pass by-laws (subject to the approval of the Government's Council of Ministers) setting tariffs and charges for sewerage services. The legislation requires that the Board be financially independent, and provides for the proper keeping of accounts and audit of the Board's books.

3.03 The principal officers of the Board would be the Chief Engineer and the Accountant/Administrator. The Chief Engineer who will be responsible for the day to day operation of the Board, is the present Municipal Engineer, working for the Board on a part-time basis. This is an acceptable arrangement since he has had full responsibility for development of the project to date. The Board has agreed that it will appoint the Accountant/Administrator prior to October 1, 1971 after notifying the Bank sufficiently in advance of such appointment for the Bank to have adequate opportunity to comment on it. The Board has further agreed that it will similarly notify the Bank in connection with any future appointments to the posts of Chief Engineer or Accountant/Administrator. Additional staff, particularly a sewerage engineer will be needed during project construction and the Board has agreed that he will be appointed not later than October 1, 1971 (see Organizational Chart, Annex 2). The treatment plant operator will be employed while the plant is under construction. No major problems are envisaged in creating an organization or recruiting the staff.

3.04 The technical staff of the Board would receive training by the consultants during the construction of the project. The Board has agreed that the Treatment Plant Foreman would be given practical training of approximately 3 months duration at a similar plant and that the Sewerage Engineer and the Technical Assistant (Maintenance and Supervision) would be given 3 months training in matters related to Sewerage System operation. Other local staff, trained during the construction of the project, should be able to operate and maintain the sewer system without additional extensive training. No funds are provided in the project for training as amounts required are relatively small and could be provided from the Board's working capital.

3.05 As the legislation provides for the members of the Council to be members of the Board, the finances of the Board will be controlled by persons familiar with municipal operations. The Municipality has been well managed and is in a sound financial position (Annex 3). Tariffs will be set to recover full costs of the service (para 6.11). The accounts and funds of the Board would be entirely separate from those of the Municipality.

3.06 Accounting will be carried out following sound public utility practices including maintenance of detailed plant records and inclusion of revenues and costs on an accrual basis. The Accountant/Administrator (para 3.03) would be a competent accountant. Suitable accounting personnel are available in Cyprus. With a competent accountant, consultant services should not be needed. The legislation provides for audit by the Auditor-General and this is satisfactory.

IV. THE PROJECT

A. Project Description

4.01 The project is the first stage of a Master Plan of sewerage for Greater Nicosia. The system would cover 1,060 acres and serve 32,000 residents occupying about 6,000 properties. It would consist of:

(i) piping for house connections;
(ii) 16 miles of connecting sewers;
(iii) 50 miles of lateral and minor trunk sewers;
(iv) 3 miles of main sewer between the collection system and the treatment site; and
(v) a sewage treatment plant.

A detailed description is given in Annex 4, and see Maps 1 and 2.

All sewage would flow by gravity at self-cleansing velocities to the treatment facility consisting of oxidation ponds. The treated waste water would be suitable for discharge to the Pedios River or to a nearby agricultural area that now cannot be irrigated because of lack of water. The project would take about 3-1/2 years to complete (Annex 6).

4.02 Except for metering the flow of treated waste water leaving the plant and providing a connection for a future irrigation system, the project does not include any irrigation works. The development of an irrigation system to use the waste water would be the responsibility of the Department of Water Development (DWD) and the farmer beneficiaries, advised by the Department of Agriculture (see para. 4.06).

4.03 Since it would be desirable to replace the water distribution system within the walls of the old city at the same time that the sewage system for this section is constructed in order to minimize costs, the Water Commission has retained the consulting engineer for the project to redesign the water system.

4.04 Approximately 6% (60 acres) of the project area is in the Turkish sector. The detailed design for this part of the project has been done by the consultant using survey data prepared for him by Turkish Cypriots. In the present political climate there may be difficulty in laying the sewers in the Turkish sector and if laid, there might be difficulty in collecting sewage revenues. The electricity and water authorities, which have continued to provide service into the Turkish sector, have not been able to service their facilities or collect revenue since 1963.

4.05 The part of the project and the reconstruction of the portion of the old water system in the Turkish sector is readily separable from the rest of the project area. The sewers, which are of minimum size and would be laid at minimum depth, are all upstream of sewers in the Greek sector. If they are not laid now, it would not affect any part of the rest of the project area; their future laying would require no further work in the Greek sector.

4.06 The availability of treated waste water for irrigation will be an important benefit of the project. Before arrangements for constructing irrigation works can be made, however, the quantity and quality of the effluent, which cannot be predicted accurately at this time, will have to be known. The Department of Agriculture plans to make quality studies on the basis of which it would provide advice on the crops suitable for irrigation, and on an appropriate price for the water. Waste water from similar plants is used successfully in other nearby countries and no problem is envisaged, especially because the proposed legislation authorizes the Board to control wastes entering the sewers. If the boron content of the waste water is found to be sufficiently high to be injurious to certain crops, for example, it could be lowered by controlling the type of laundry detergents used by the public. During negotiations, assurances were obtained from the Government that these studies will begin within twelve months of the plant becoming operational, and that the Board will establish charges acceptable to the Bank for the sale of waste water.

B. Cost Estimates and Financing

4.07 The project cost estimates are summarized below. Details on a yearly basis are shown in Annex 5.

	--- £C thousands ---			--- US$ thousands ---		
	Local	Foreign	Total	Local	Foreign	Total
Pipes, Fittings and Equipment	-	406	406	-	975	975
Civil Works	948	523	1,471	2,275	1,255	3,530
Preliminary Construction of Trunk Sewers and Engineering (Annex 4 para D)	83	-	83	199	-	199
Land	67	-	67	161	-	161
Engineering	32	70	102	77	168	245
Sub-total	1,130	999	2,129	2,712	2,398	5,110
Contingencies - Physical (15%)	148	143	291	355	343	698
- Price (10%)	98	95	193	235	228	463
Total Construction Cost	1,376	1,237	2,613	3,302	2,969	6,271
Interest during Construction on Bank Loan	-	221	-	-	531	-
Total Foreign Exchange to be Financed by Bank	-	1,458	-	-	3,500	-

4.08 Estimates for pipe and accessories are based on quotations received by the consultant from potential suppliers. As no sewerage projects have been built in Cyprus, estimates for civil works were made on the basis of contracts for similar work in the area. A physical contingency of 15% has been allowed for all expenditures other than land and engineering. A price escalation contingency of 10% has also been allowed. This is considered adequate in view of the price trends in Cyprus over the past few years and the short procurement period for imported goods.

4.09 The foreign exchange cost of engineering services before July 1, 1969, (US$24,000), and of sewers presently under construction (US$175,000) are considered part of the project, but are not proposed for Bank financing. Therefore, they are included as local costs both in the table (para 4.07) and in Annex 5.

4.10 With the exception noted above (para 4.09) the proposed Bank loan would finance the full foreign exchange requirements of the project including retroactive financing of the foreign exchange component of the engineering services for detailed design paid since July 1, 1969. (These costs to date since July 1, 1969 are estimated at US$80,000).

4.11 The local currency requirements of the project will be provided as described in para 6.02.

C. Engineering and Construction

4.12 The consultants, MacLaren International Ltd. of Toronto, have completed the detailed working drawings and are preparing tender documents. They will evaluate the bids and supervise construction.

D. Procurement and Disbursement

4.13 All contracts will be bid on internationally following Bank procurement guidelines. It is likely that, in addition to foreign contractors, three local contractors would participate in the bidding for civil works contracts. Practically all materials and equipment required for the project would be imported.

4.14 Bank disbursement would be against the C.I.F. costs of imported goods and the foreign exchange costs of engineering services. Disbursements on civil works contracts would be a fixed percentage of the costs representing the estimated imported components. This percentage has been agreed at 35%.

4.15 Any loan funds not required for the project will be cancelled.

4.16 Steps are being taken now to acquire the treatment site, easements and rights-of-way for applicable portions of trunk sewers. During negotiations assurance were obtained that such land, easements, and rights-of-way will be acquired by July 31, 1971.

E. Environmental Effects

4.17 The project will substantially improve the environment of the city by removing potential health hazards and nuisances to sight and smell caused by the many defective septic tanks and cesspits. No odor nuisance is expected from the treatment plant which in any event is down wind of the city. It will improve the nearby rural environment by reducing the areas used for the dumping of septic tank cleanings. The condition of the Pedios River will be improved by converting much of the polluted water now entering the river into treated waste water suitable for the irrigation of certain crops.

V. JUSTIFICATION

5.01 The present method of sewage disposal using private septic tanks and absorption pits produces nuisances and hazards to health, and Nicosia's problems become worse each year. As the population density and the water use per capita increases, the ability of the soil to absorb effluent decreases, and maintenance costs of private sewer systems rise. The only satisfactory answer to Nicosia's problem of disposing of municipal liquid waste is through a central collection and disposal system.

5.02 The need for a sewerage system has long been recognized by Government and the Municipality, which has commissioned reports on sewers. It has employed engineering consultants to prepare a staged Master Plan for sewers, and has already invested £C73,000 (US$175,000) in construction of sewers in an area in which road construction is being carried out.

5.03 The area to be sewered is now subject to building height restrictions because of the present problem of sewage disposal. Construction of sewers will permit relaxation of these restrictions, in effect, increasing the land supply in the central area of Nicosia. Resultant higher densities in this area should result in more efficient use of roads, water supply and electricity systems, etc., and will thereby permit delaying new infrastructure investments in outlying areas.

5.04 The sewerage system will also end the rising costs of septic tank construction, maintenance and the trucking of effluent. In Nicosia, trucking costs are estimated at £C90,000 for the year 1969 and are expected to increase steadily until sewers are built. Most of this cost is incurred in the project area.

5.05 Agriculture is more restricted by lack of water than lack of land. Yields from irrigated areas are, on the average about eight times greater than those from dry-farmed areas, and there is a need to conserve and fully utilize all possible sources including treated waste water for irrigation purposes. The actual benefits are difficult to quantify as they will be dependent upon both quantity and quality of the effluent. However, the volume of treated waste water estimated to be available by 1979 should increase the value of the agricultural output up to about £C35,000 per annum depending on the crop. For financial projections it has been assumed that waste water will be sold at 10 mils/m^3 (US$0.09 per 1,000 gals) which is in the middle of a general range of prices presently being paid for irrigation water. At this price the estimated 1979 revenue is £C10,500 which is about 3% of the Board's total revenues. When related to increase in agricultural output the value of the treated waste water would range between 7 and 35 mils/m^3.

5.06 Cyprus has a rapidly expanding tourist industry. The island's international airport is located near Nicosia so that the city is the main arrival and departure point for tourists, most of whom thus spend some time in the city. The first stage sewer system will help not only to make the area more attractive to visitors, but will also reduce the hazards of epidemic disease which could be disastrous for the tourist industry.

5.07 The internal financial return on the project calculated on the basis of net project revenues is approximately 12% (Annex 7).

VI. FINANCIAL ASPECTS

A. Financing Plan

6.01 The financing plan for the years of project construction, 1971-74, is summarized below:

	£C 000's	US$ Equivalent 000's	%
Application of Funds			
Construction expenditures	2,613	6,271	80.2
Interest during construction - IBRD	221	531	6.8
- Other loans	37	89	1.1
Loans for connections	291	698	8.9
Working capital	97	233	3.0
	3,259	7,822	100.0
Sources of Funds			
Internal cash generation	356	854	10.9
Less Debt service requirements	325	780	9.9
Net cash generation	31	74	1.0
Proposed IBRD loan	1,458	3,500	44.7
Cyprus Loan Commission	65	156	2.0
Loan from Government of Cyprus	200	480	6.1
Local bond issues	1,500	3,600	46.0
Repayment of loans for connections	5	12	.2
	3,259	7,822	100.0

6.02 The four sources of new capital are briefly described below:

(a) IBRD Loan £C1,458,000

For the purposes of this report, interest on the Bank loan has been assumed at 7-1/4%. A term of 25 years, including a grace period of about 4 years is proposed. The estimated physical life of the assets is over 50 years.

(b) Cyprus Loan Commission £C65,000

Funds have already been provided by the Loan Commission to the Municipality of Nicosia to cover the cost of sewer construction which was carried out concurrently with road reconstruction in 1970. This debt will be transferred to the Sewage Board. The terms of the loan provide for repayment over 12 years with interest at 5-1/2% per annum.

(c) Loan from Government of Cyprus £C200,000

The Government will provide this sum for working capital. This loan will be for a 25-year period at 6-1/2% interest, including a grace period of 7 years on amortization, and without payment of interest for the first 2 years.

(d) Local bond issues £C1,700,000

The major portion of the local currency cost is to be met from the proceeds of bond issues in Cyprus, underwritten by the Central Bank and guaranteed by the Government. Each issue will be for a 12-year term and at 7-1/4 - 7-1/2% interest, with a sinking fund to provide for redemption of 50% of the amounts issued. The Government has guaranteed refinancing of the remaining 50% for a further 12-year period. Such bond issues, together with the bond issues for the Famagusta project, would at the same time assist the Central Bank in the development of a capital market in Cyprus. A substantial portion of these issues should be taken up by the commercial banks as these are subject to exchange controls and cannot invest outside Cyprus without permission. To the extent that the bonds are not sold the Government will take up the balance through the Central Bank. These issues will also provide funds for loans to householders for financing connection costs in cases where the householder cannot afford to meet connection costs by payment in cash. Actual issues will be arranged to provide the Board with funds as required but for the purpose of financial projections it has been assumed that issues totalling £C1,500,000 will be made during the period 1971-1974 with the balance of £C200,000 being issued in 1975 to provide funds for additional loans for house connections.

The Government has also undertaken to provide any residual funds which may be required.

B. Sewerage Tariffs, and Financial Prospects of the Sewage Board

6.03 The Board's revenues will come from sewer service charges based on water sales and property assessments. About two-thirds of this revenue will come from property assessments during the next ten years.

6.04 Interest and debt redemption will represent approximately 90% of the Board's annual costs. Charges will be set to cover annual costs in the early years. With the anticipated growth in water consumption and property assessments, these charges would generate cash surpluses beginning in 1977.

6.05 The financial projections assume charges of 50 mils/m^3 on water sales, 36 mils/EC of assessed property value in the project area and 12 mils/EC of assessed property value in areas to be sewered at a later date. The same required revenue could be obtained from other combinations of charges and assessments with similar incidence on users. The exact rates to be charged will depend upon final costs of the project and upon actual assessed property values and water consumption, but the Board will commence levying charges based on property assessments effective from January 1, 1973. Charges based on water consumption will commence as properties are connected to the sewers.

6.06 The sewage rate of 50 mils/m^3 on water consumption would be equal to the initial rate block for water charges, also 50 mils/m^3; the assumed sewage assessment of 36 mils/EC of assessed value for properties in the project area, would be 40% more than the municipal tax levy of 25 mils/EC of assessed value.

6.07 To assess the implications of the annual charges, an example lower-income householder with a monthly water consumption of 15 m^3 and a property having an assessed value of EC300 1/ will presently pay approximately EC18 per annum for water and municipal taxes. Charges for sewerage will increase this annual payment by approximately EC20.

6.08 In addition to the annual charges, property owners will incur initial connection charges. In the event that a property owner may not be able to afford the cash cost of making the connection the Board will provide financial assistance. Funds will be made available to the Board through the proceeds of Bond issues and will be re-lent to householders who will be required to repay over an 11 year term with interest at 7-1/2% per annum. Collection of these amounts will be arranged through the Inland Revenue Department by means of addition to the property tax.

1/ The present basis of property assessment is out of date and assessed values are related to pre-1930 costs. Revision of this assessment base has been under Government review for some time, but discussion of the position did not indicate any probability of the work being undertaken in the near future.

6.09 The revenue projections for water usage and for the sewer user charge are based upon the expectation of present water consumption increasing as follows: in the project area outside the walls of the old city, by 3-1/4% per annum; within the walls, by 1-1/4% per annum until the obsolete water system is replaced in 1974, at which point an immediate increase of 50% in per capita consumption is forecast which would increase thereafter by 3-1/4% per annum. Revenue projections from property assessments are based upon present assessments with an annual rate of growth of 3%, which is equal to the rate of growth over the past 8 years.

6.10 The charges based on water consumption will be billed and collected by the water authorities and the charges based on property assessments will be billed and collected by the Inland Revenue Department. The Inland Revenue Department presently bills and collects municipal taxes for a 2-1/2% commission. Similar arrangements will be made in connection with the sewerage assessments. Agreement has been reached with the Water Board to collect sewerage charges at a rate of commission not to exceed 5%.

6.11 During negotiations assurance was obtained that the Board will maintain charges sufficient to generate annual revenues to cover:

(i) operating expenses (including depreciation);
(ii) debt interest;
(iii) repayment of debt (including sinking fund payments) to the extent not covered by depreciation, and
(iv) provision for a reasonable reserve.

6.12 Projected rates of return on net plant would be 7.6% in 1976 when the project is completed and the majority of properties in the project area connected, increasing steadily thereafter, reaching 10% in 1979 (Annex 8).

6.13 The sewerage Master Plan provides for system extensions in due course but these have not been included in the financial projections as the timing of the construction is too uncertain. Substantial extensions appear unlikely before the late 1970's.

6.14 Details of the financial projections through 1979 are shown in Annexes 8, 9, 10 and 11.

VII. RECOMMENDATIONS

7.01 During loan negotiations, agreement was reached on the following principal points:

(a) The Board will appoint and train required staff (paragraphs 3.03 and 3.04)

(b) The Government will undertake studies leading to the optimum use of treated waste water (paragraph 4.06).

(c) The Government will ensure provision of local financing for the project (paragraph 6.02).

(d) The Board will finance the cost of connections in cases where property owners are not able to meet the costs of connection by payment in cash. (Paragraph 6.08).

(e) The Board will establish and maintain charges and assessments which will ensure revenues sufficient to cover operating costs and debt service requirements plus a reasonable reserve (paragraph 6.11).

7.02 The project provides a suitable basis for a Bank loan of US$3.5 million, for a term of 25 years including a 4-year grace period.

March 9, 1971

CYPRUS

NICOSIA SEWERAGE PROJECT

WATER RESOURCES AND PUBLIC WATER SUPPLY IN CYPRUS

Relation to Cyprus Economy

1. Cyprus, an island of 3,750 square miles with a population of 630,000, has a typical Mediterranean climate with light annual rainfall and hot, dry summers. Annual rainfall, which occurs in the winter, averages 18 inches, varying between 12 inches on the coast and 40 inches in the mountains. There are no perennial rivers and the only natural storage of water is in the groundwater aquifers. Storage sites for development of surface water are relatively few and expensive to develop. Agriculture, the most important activity on the island, is by far the largest user of water. Agricultural production, the value of which has increased 9% per year since independence, is limited by water resources available for irrigation. Public water supply for domestic and industrial use is the second largest user of the water resources. The tourist industry, which is very dependent upon good water supply systems, is expanding rapidly and may shortly become next only to agriculture as a producer of foreign exchange. Since there will be increasing competition for the limited water between irrigation and public water systems, return of public water to agriculture through the reclamation of sewage will become increasingly important for Cyprus.

2. The groundwater levels in all but one of the island's aquifers are dropping as a result of continued over-pumping. The Department of Water Development (DWD) estimates that half the volume of groundwater now being pumped, most of which is used for irrigation, represents over-extraction. Two significant UNDP studies on water resources are just about complete. One, an evaluation of the island's groundwater resources contains recommendations as to how to best use these scarce resources. The other provides an inventory of all surface water resources along with possible storage sites so that a Master Plan can be prepared for total water resource development. The studies reveal that additional irrigation water cannot be provided in the immediate vicinity of Nicosia or Famagusta.

Public Water Supplies

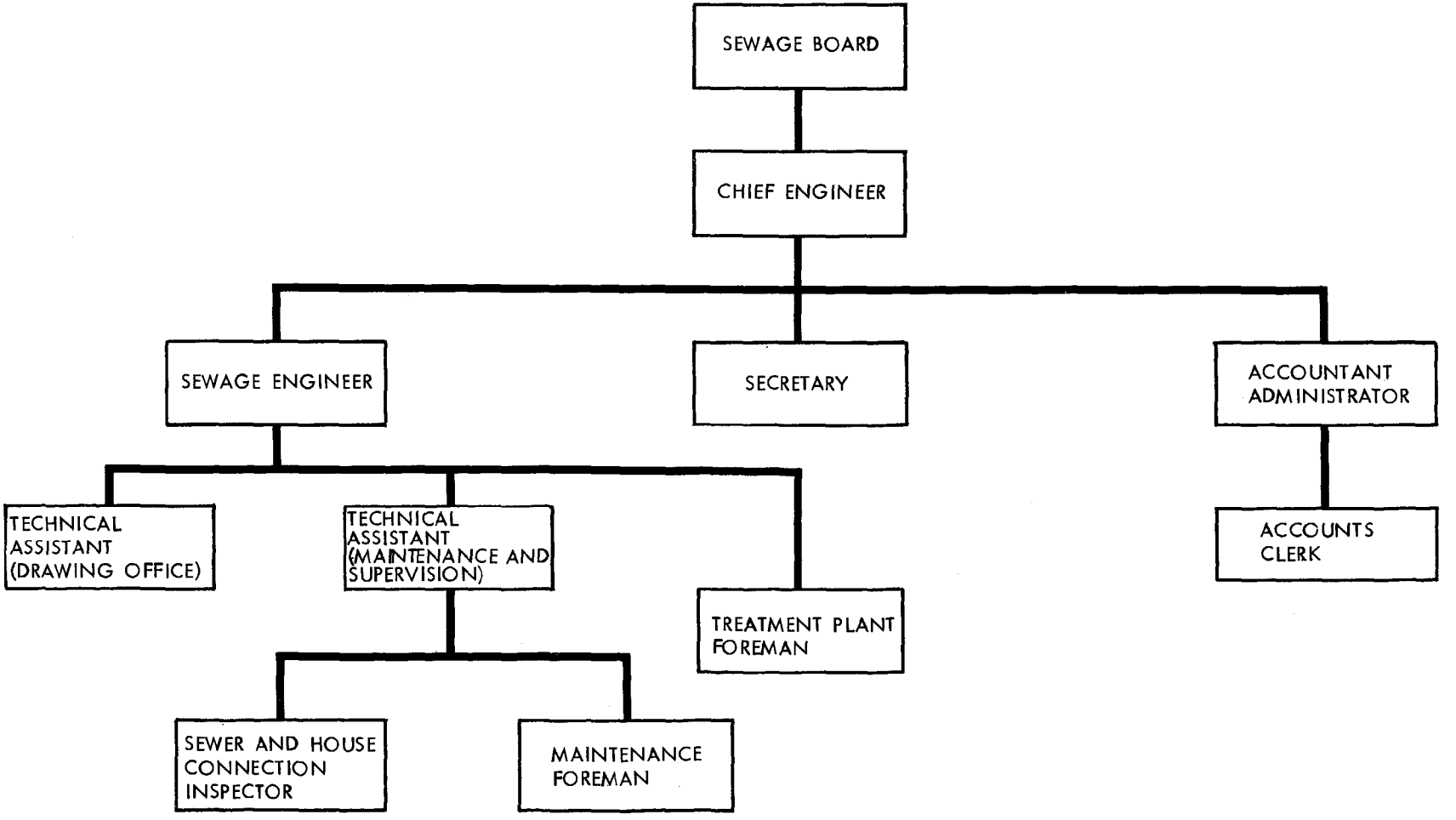
3. Groundwater is the only source of the island's public water supplies at present. One-third of the population living in the four major towns (Nicosia, Limassol, Famagusta and Larnaca) either have an adequate supply now or an adequate future supply is assured by the Department of Water Development (DWD). DWD is responsible for future bulk supply

of domestic water, although some of both Nicosia's and Famagusta's older sources are locally owned. DWD began supplying some of Famagusta's bulk supply in 1970 and will increase the supply still further over the next three years. DWD also has plans for adding to Nicosia's bulk supply over the next five years. The remainder of the population live in some 628 villages of which over 85% now have piped water providing at least 10 gallons per capita per day. Only 10% of the population live in villages facing a serious water shortage. The water supply schemes of the villages are planned and constructed by DWD, which is responsible for the bulk supply of water to the villages. Local financially independent water commissions are responsible for operation, administration and retailing the water through water meters to the public.

The Present Water Supply Situation in Nicosia

4. Three authorities are involved in the water supply of Nicosia. The old city "within the walls" is supplied by the Nicosia Water Commission through an old-fashioned system which is in urgent need of replacing. The area outside the walls, but within the pre-1968 municipal boundary, is served by the Nicosia Water Board, an independent agency. The remaining area of Greater Nicosia, forming a ring around the Nicosia Water Board area, is served by the Department of Water Development. The Nicosia Water Board, which reads meters, bills and collects for the three separate water authorities will bill and collect the sewerage charges based on water use.

NICOSIA SEWERAGE PROJECT
ORGANIZATION CHART
NICOSIA SEWAGE BOARD



IBRD - 5603

ANNEX 2

ANNEX 3

CYPRUS

NICOSIA SEWERAGE PROJECT

NICOSIA MUNICIPAL CORPORATION

Financial Data of Municipality 1/ for 1968 and 1969
in EC '000s

	1968	1969
Summary Revenue and Expense Statements		
Revenues		
Licenses and Permits	107.9	128.9
Rates and Taxes	75.5	91.0
Fees and Tolls	95.0	113.4
Rent	25.8	30.3
Miscellaneous	66.6	100.2
Total Revenues	370.8	463.8
Expenses 2/		
Salaries and Wages	68.2	97.5
Waste Disposal and Fire Protection	78.3	91.5
Maintenance of Roads and Buildings	64.1	89.2
Subscriptions and Special Payments	1.3	1.9
Charity	3.3	7.3
Miscellaneous	48.8	62.7
Total Expenses	264.0	350.1
Operating Surplus	106.8	113.7
Debt Service	58.4	74.7
Surplus for year	48.4	39.0
Long-Term Debt and Cash Balances 3/		
Long-Term Debt Outstanding	613.7	760.6
Cash Balances		
General Funds	66.2	81.7
Other Funds	159.9	153.1

1/ Municipal boundaries enlarged in April 1968.
2/ Certain Capital Expenditures items have been deducted.
3/ Balance Sheets not prepared.

March 9, 1971

CYPRUS

NICOSIA SEWERAGE PROJECT

PROJECT DESCRIPTION

A. Introduction

The project is the execution of the first stage of a master plan of a sewerage system for Greater Nicosia. It includes construction of a complete sewage collection system for the area of the city most acutely in need of sewerage, the main trunks through the project area to the treatment site, and construction of the first stage treatment plant. The topography is such that sewage from the entire metropolitan area can be drained by gravity to the treatment site.

B. The Sewage Collection System

The sewage collection system will cover 1,060 acres and serve about 32,000 people living in some 6,000 individual properties. About one third of the area covers the southern half of the old city "within the walls", and the rest covers a densely populated part of the clay zone south of the wall.

About 42 miles of 8 inch lateral sewers, and 6 miles of 10 inch to 24 inch sub-trumk sewers will provide a sewer for every street in the project area. About 16 miles of 4 inch and 6 inch connections to the street sewers from the property line of each building plot will enable practically all present and future buildings in the project area to be connected to the sewerage system without further street excavation. Piping will also be provided for connections on private property. The sewers will be laid at slopes giving a minimum self-cleansing sewage velocity of 2-1/2 feet per second. The minimum sewer depth of 6 feet, besides providing good drainage of practically every plumbing system in the area, will enable future work to be done on other underground utilities without disturbing the sewerage system.

The laying of the sewers in the section within the walls of the old city will be done concurrently with the rehabilitation of the water system in that area.

About 60 acres of the project within the walls of the old city are in the Turkish sector where administrative and political problems will have to be solved before sewers can be laid. If the problems can be solved during the project years, this small area can be sewered as part of the project. If not, the rest of the proect will not be affected, and the sewers can be built in the Turkish sector later.

C. Main Trunk Sewers

The main trunk sewers include about 1.7 miles of 36 inch main through the sewage collection area, and 3.3 miles of 40 and 44 inch mains leading from the project area to the treatment plant. All the trunk sewers will be laid at grades giving sewage velocities of better than 3-1/2 feet per second, when full, and at least 2 feet per second at the outset when the sewers operate at less than capacity.

During appraisal studies were made to see if any trunk mains could be reduced in diameter. While no advantage could be found in reducing the diameter of the 36 inch trunk sewer through the walled city, as a result of the studies the diameter of the main trunk down-stream of the walled city was reduced from 54 inches to 44 inches, and the number of manholes was reduced.

D. Sewers Presently Under Construction

About a mile of trunk sewers were laid in 1970 concurrently with reconstruction and realignment of some major roads. This sewer forms part of the project and is regarded as preliminary construction. (Para 6.02b).

E. Treatment Plant

The treatment plant will be built on a well chosen site on the right bank of the Pedios River about three miles northeast of the project area. An industrial district screens the site from any residential or commercial district. Moreover, the prevailing wind is away from the city. Sewage from any part of the metropolitan area can flow to the site by gravity. Effluent from the plant can flow by gravity either to a nearby irrigable farming area or to the Pedios River below town.

Initial treatment will be by aerated and facultative lagoons. Two aerated lagoons each 1 acre in area and 8 feet deep will operate in parallel. The sewage will then pass to 4 facultative lagoons each 3-1/2 acres in area and 5 feet deep. The capacity of the plant will be about 2.2 Imgd. This is an inexpensive type of treatment, which, in the climate of Nicosia, should provide an effluent suitable for either irrigation or discharge to the Pedios River. Sufficient land will be obtained for future expansion. If, at a later stage, a more compact type of plant should be deemed necessary, the first stage lagoons could be still used for effluent polishing. The plant will include comminution of the influent and provide for chlorination of the effluent.

F. Future Expansion

The project area can be expanded by adding small tributary areas to the south at any time. Subsequent stages of the Master Plan can be sewered without changes to the trunk system and with simple expansion of the treatment plant.

March 9, 1971

CYPRUS

NICOSIA SEWERAGE PROJECT

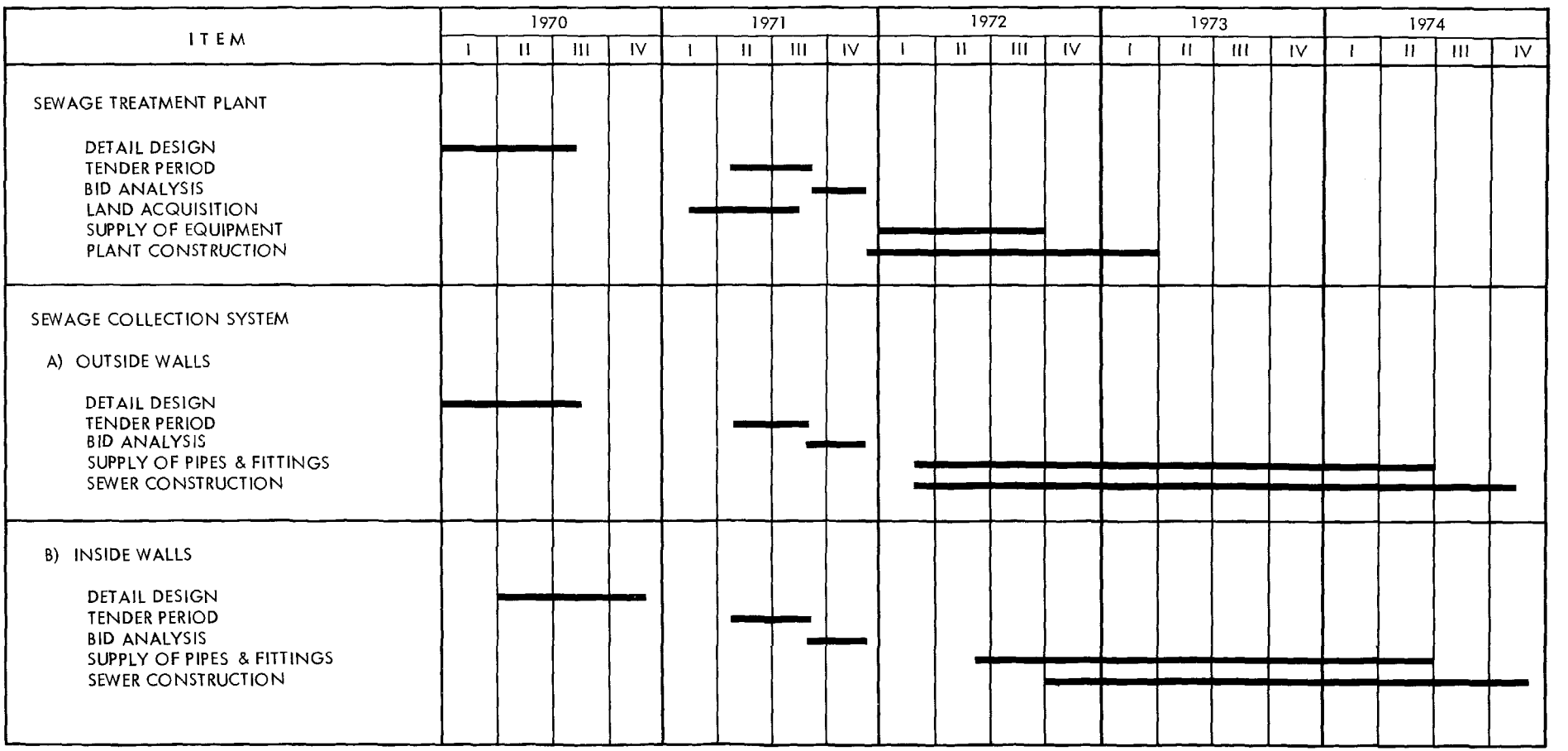
COST ESTIMATE
£C 000's

	Local Costs					Foreign Exchange					
	1971	1972	1973	1974	Sub-Total	1971	1972	1973	1974	Sub-Total	Total
Sewerage System:											
Pipes, Fittings, Electrical and Mechanical Equipment and Accessories							184.0	159.4	62.6	406.0	406.0
Construction of Sewers and Treatment Plant	7.0	317.0	458.0	166.0	948.0	15.8	212.2	211.6	83.4	523.0	1,471.0
Preliminary Construction of Trunk Sewers and Engineering	83.0	-	-	-	83.0						83.0
Total Sewerage Construction	90.0	317.0	458.0	166.0	1,031.0	15.8	396.2	371.0	146.0	929.0	1,960.0
Land	67.0	-	-	-	67.0	-	-	-	-	-	67.0
Engineering Charges	10.0	6.0	8.0	8.0	32.0	26.5	13.2	21.0	9.3	70.0	102.0
Sub-Total	167.0	323.0	466.0	174.0	1,130.0	42.3	409.4	392.0	155.3	999.0	2,129.0
Contingencies: Physical (15%)	5.4	48.0	69.0	25.2	147.6	4.0	59.8	56.6	22.3	142.7	290.3
- Price (10%)	3.6	32.0	46.0	16.8	98.4	2.7	39.9	37.8	14.9	95.3	193.7
Total	176.0	403.0	581.0	216.0	1,376.0	49.0	509.1	486.4	192.5	1,237.0	2,613.0
Interest on Bank Loan during Construction						7.5	37.5	76.7	99.3	221.0	
Total Foreign Exchange Requirement						56.5	546.6	563.1	291.8	1,458.0	

ANNEX 5

March 2, 1971

NICOSIA SEWERAGE PROJECT
CONSTRUCTION SCHEDULE



ANNEX 6

IBRD - 5604

ANNEX 7

CYPRUS

NICOSIA SEWERAGE PROJECT

INTERNAL FINANCIAL RETURN ON PROJECT
(£C 000's)

	Project Cost	Net Cash Flow from Operations	Net Project Cash Flow 1/
Years ending December 31, 1971	219	-	(219)
1972	840	-	(840)
1973	984	178	(806)
1974	377	199	(178)
1975	-	238	238
1976	-	265	265
1977	-	279	279
1978	-	288	288
1979	-	298	298 2/

Internal Financial Return is 12% over 50 years.

1/ The benefits of health hazard reduction, improved use of infrastructure, increased agricultural production and reduction in septic tank operating costs, are not included here, (see paras 5.03, 5.04, 5.05 and 5.06).

2/ Assumed constant after 1979.

March 9, 1971

CYPRUS
NICOSIA SEWAGE BOARD

ESTIMATED INCOME STATEMENTS 1973-1979

	1973	1974	1975	1976	1977	1978	1979
Estimated Annual Water Consumption - m^3 000's -Connected Properties	130	602	1,245	1,659	1,797	1,855	1,915
Estimated Annual Property Assessment - £C 000's							
Project Area	4,383	4,515	4,650	4,790	4,934	5,082	5,234
General Benefit Area	2,500	2,575	2,652	2,732	2,814	2,898	2,985
Estimated Annual Effluent Sale - m^3 000's	-	331	684	912	988	1,020	1,053
			£C 000's				
Revenues							
Based on Water Consumption (at 50 mils)	6.5	30.1	62.2	82.9	89.9	92.7	95.8
Less 5% Collection Charge	.3	1.5	3.1	4.1	4.5	4.6	4.8
	6.2	28.6	59.1	78.8	85.4	88.1	91.0
Based on Property Assessments							
Project Area (at 36 mils)	157.8	162.5	167.4	172.4	177.6	183.0	188.4
General Benefit Area (at 12 mils)	30.0	30.9	31.8	32.8	33.8	34.8	35.8
	187.8	193.4	199.2	205.2	211.4	217.8	224.2
Less 2½% Collection Charge	4.7	4.8	5.0	5.1	5.3	5.5	5.6
	183.1	188.6	194.2	200.1	206.1	212.3	218.6
Sales of Effluent (at 10 mils)	-	3.3	6.8	9.1	9.9	10.2	10.5
Total Revenues	189.3	220.5	260.1	288.0	301.4	310.6	320.1
Operating Costs							
Salaries, Wages and Allowances	6.3	10.3	10.3	10.3	10.3	10.3	10.3
Energy	3.5	6.7	6.7	6.7	6.7	6.7	6.7
Chemicals	.5	1.1	1.5	1.6	1.7	1.8	1.9
Maintenance	-	1.0	1.0	1.0	1.0	1.0	1.0
General Expenses	1.0	2.0	2.5	2.5	2.5	2.5	2.5
Depreciation	24.4	47.3	57.4	57.4	57.4	57.4	57.4
Total Operating Costs	35.7	68.4	79.4	79.5	79.6	79.7	79.8
Income Before Interest	153.6	152.1	180.7	208.5	221.8	230.9	240.3
Interest (Net)	97.2	119.4	221.9	204.2	196.4	192.3	187.5
Net Income (Deficit)	56.4	32.7	(41.2)	4.3	25.4	38.6	52.8
Return On Net Plant 1/			6.5%	7.6%	8.3%	8.8%	9.4%
Earned Surplus							
Balance, Beginning of year	-	56.4	89.1	47.9	52.2	77.6	116.2
Net Income (Deficit) for year	56.4	32.7	(41.2)	4.3	25.4	38.6	52.8
Balance, end of year, as Balance Sheet	56.4	89.1	47.9	52.2	77.6	116.2	169.0

ANNEX 8

1/ Income before interest divided by net plant in service at beginning of year.

March 3, 1971

CYPRUS
NICOSIA SEWAGE BOARD

ESTIMATED CASH FLOW STATEMENTS 1971 - 1979

	1971	1972	1973	1974	1975	1976	1977	1978	1979
Sources of Funds									
Income Before Interest			153.6	152.1	180.7	208.5	221.8	230.9	240.3
Add Depreciation			24.4	47.3	57.4	57.4	57.4	57.4	57.4
			178.0	199.4	238.1	265.9	279.2	288.3	297.7
Less Increase in Accounts Receivable			18.0	2.9	3.7	2.6	1.3	.9	.9
Net Cash Generated from Operations			160.0	196.5	234.4	263.3	277.9	287.4	296.8
Repayment of Loans for Connections - Interest			.7	6.3	21.4	33.3	34.8	32.4	29.7
- Capital Repayments			.5	5.3	18.4	30.6	36.2	39.1	42.3
Interest Received - Sinking Fund			.7	2.7	5.5	8.9	12.5	16.2	20.2
Proceeds from Loans									
Local Bonds		400.0	700.0	400.0	200.0				
Loan Commissioners	65.0								
Government of Cyprus	200.0								
IBRD	56.5	546.6	563.1	291.8					
Total Proceeds from Loans	321.5	946.6	1,263.1	691.8	200.0				
Total Sources of Funds	321.5	946.6	1,425.0	902.6	479.7	336.1	361.4	375.1	389.0
Application of Funds									
Construction Expenditures	225.0	912.1	1,067.4	408.5					
Loans for Connections	-	9.0	76.0	206.4	176.3	51.8	3.6	3.6	3.6
Debt Service									
Interest during Construction									
Local Bonds	-	30.0							
Loan Commissioners	3.6	3.4							
IBRD	7.5	37.5	76.7	99.3					
Interest Charged to Revenue									
Local Bonds			82.5	112.5	127.5	127.5	127.5	127.5	127.5
Loan Commissioners			3.1	2.9	2.6	2.4	2.1	1.8	1.5
Government of Cyprus			13.0	13.0	13.0	13.0	13.0	13.0	12.6
IBRD					105.7	103.5	101.1	98.6	95.8
Amortization and Sinking Fund									
Local Bonds		11.9	33.3	47.1	55.9	59.3	62.9	66.6	70.6
Loan Commissioners	3.9	4.1	4.4	4.6	4.9	5.1	5.4	5.7	6.0
Government of Cyprus								6.2	6.6
IBRD					30.5	32.7	35.1	37.6	40.4
Total Debt Service	15.0	86.9	213.0	279.4	340.1	343.5	347.1	357.0	361.0
Total Application of Funds	240.0	1,008.0	1,356.4	894.3	516.4	395.3	350.7	360.6	364.6
Net Cash Generation	81.5	(61.4)	68.6	8.3	(36.7)	(59.2)	10.7	14.5	24.4
Cash Balance, Beginning of Year	-	81.5	20.1	88.7	97.0	60.3	1.1	11.8	26.3
Cash Balance, End of Year	81.5	20.1	88.7	97.0	60.3	1.1	11.8	26.3	50.7

March 3, 1971

ANNEX 9

CYPRUS

NICOSIA SEWAGE BOARD

ESTIMATED BALANCE SHEETS 1971-1979

£C 000's

	1971	1972	1973	1974	1975	1976	1977	1978	1979
ASSETS									
Sewerage Plant	236.1	1,219.1	2,363.2	2,871.0	2,871.0	2,871.0	2,871.0	2,871.0	2,871.0
Less Depreciation to date	-	-	24.4	71.7	129.1	186.5	243.9	301.3	358.7
Net Plant	236.1	1,219.1	2,338.8	2,799.3	2,741.9	2,684.5	2,627.1	2,569.7	2,512.3
Loans for connections		9.0	84.5	285.6	443.5	464.7	432.1	396.6	357.9
Accounts Receivable	-	-	18.0	20.9	24.6	27.2	28.5	29.4	30.3
Cash	81.5	20.1	88.7	97.0	60.3	1.1	11.8	26.3	50.7
Total Assets	317.6	1,248.2	2,530.0	3,202.8	3,270.3	3,177.5	3,099.5	3,022.0	2,951.2
LIABILITIES									
Outstanding Debt:									
Local Bonds		400.0	1,100.0	1,500.0	1,700.0	1,700.0	1,700.0	1,700.0	1,700.0
Less Sinking Fund Investments	-	11.9	45.2	92.3	148.2	207.5	270.4	337.0	407.6
		388.1	1,054.8	1,407.7	1,551.8	1,492.5	1,429.6	1,363.0	1,292.4
Loan Commissioners	61.1	57.0	52.6	48.0	43.1	38.0	32.6	26.9	20.9
Government of Cyprus	200.0	200.0	200.0	200.0	200.0	200.0	200.0	193.8	187.2
IBRD	56.5	603.1	1,166.2	1,458.0	1,427.5	1,394.8	1,359.7	1,322.1	1,281.7
Total Net Debt	317.6	1,248.2	2,473.6	3,113.7	3,222.4	3,125.3	3,021.9	2,905.8	2,782.2
Earned Surplus			56.4	89.1	47.9	52.2	77.6	116.2	169.0
Total Liabilities	317.6	1,248.2	2,530.0	3,202.8	3,270.3	3,177.5	3,099.5	3,022.0	2,951.2

March 4, 1971

ANNEX 10

CYPRUS

NICOSIA SEWERAGE PROJECT

ASSUMPTIONS FOR FINANCIAL PROJECTIONS

Income Statements

1. Annual water consumption is based initially upon present water consumption with annual increases as detailed in paragraph 6.09.

2. Annual property assessment is projected to increase at 3% per annum, based on historical growth over the period 1960-68.

3. Effluent sale for the years 1974-79 is based on the expectation sales will equal 55% of water consumption after taking into account losses between water supplied and treatment plant delivery, and possible non-saleability of effluent in the three winter months. The 10 mil/m^3 sale price is an estimate and represents the mid-point in a probable range.

4. Charges of 50 mils on water consumption, 36 mils on assessed property values in the project area and 12 mils in the areas to be sewered at later stages, are assumed in order to generate required revenues in the initial years of operation.

5. Collection charges of 2-1/2% on property assessments and of 5% on water consumption are as agreed between the Board and the collecting authorities. The 5% rate is a maximum and the actual charge may be slightly less.

6. Depreciation has been charged at 2% per annum, based upon approximate average physical life of the assets.

7. The proposed collection agencies, the Inland Revenue Department and the Water Board, are substantially free from bad debts. It is considered that this situation will also apply to sewerage bills and bad debts are therefore considered to be negligible.

Cash Flow Statements

8. Cash operating expenses amount to approximately 10% of total costs. As most of such operating expenses are labour costs the Accounts Payable at the year-end will be negligible and thus have been ignored. Inventory has also been ignored as no substantial cash outlay is anticipated. It is estimated that year-end Accounts Receivable will amount to approximately 10% of annual revenues, excluding sales of effluent.

9. Bond issues are assumed to be made to meet cash requirements.

10. Sinking fund investments are assumed to earn 6% per annum.

11. Timing of future major extensions is uncertain and construction of Stage II of the Master Plan is unlikely to commence before the late 1970's.

Balance Sheets

12. Amounts due to the Loan Commissioners represent advances made for sewer construction commenced in 1970 in areas where road reconstruction was to be carried out.

13. The sum of £C200,000 advanced by the Government of Cyprus during 1971 is intended to cover working capital and preliminary expenditures.

14. Loans to householders for connection costs are assumed to cover 80% of total estimated connection costs. Repayments are based on an 11 year term and interest at 7-1/2% per annum.

March 9, 1971

ANNEX 12

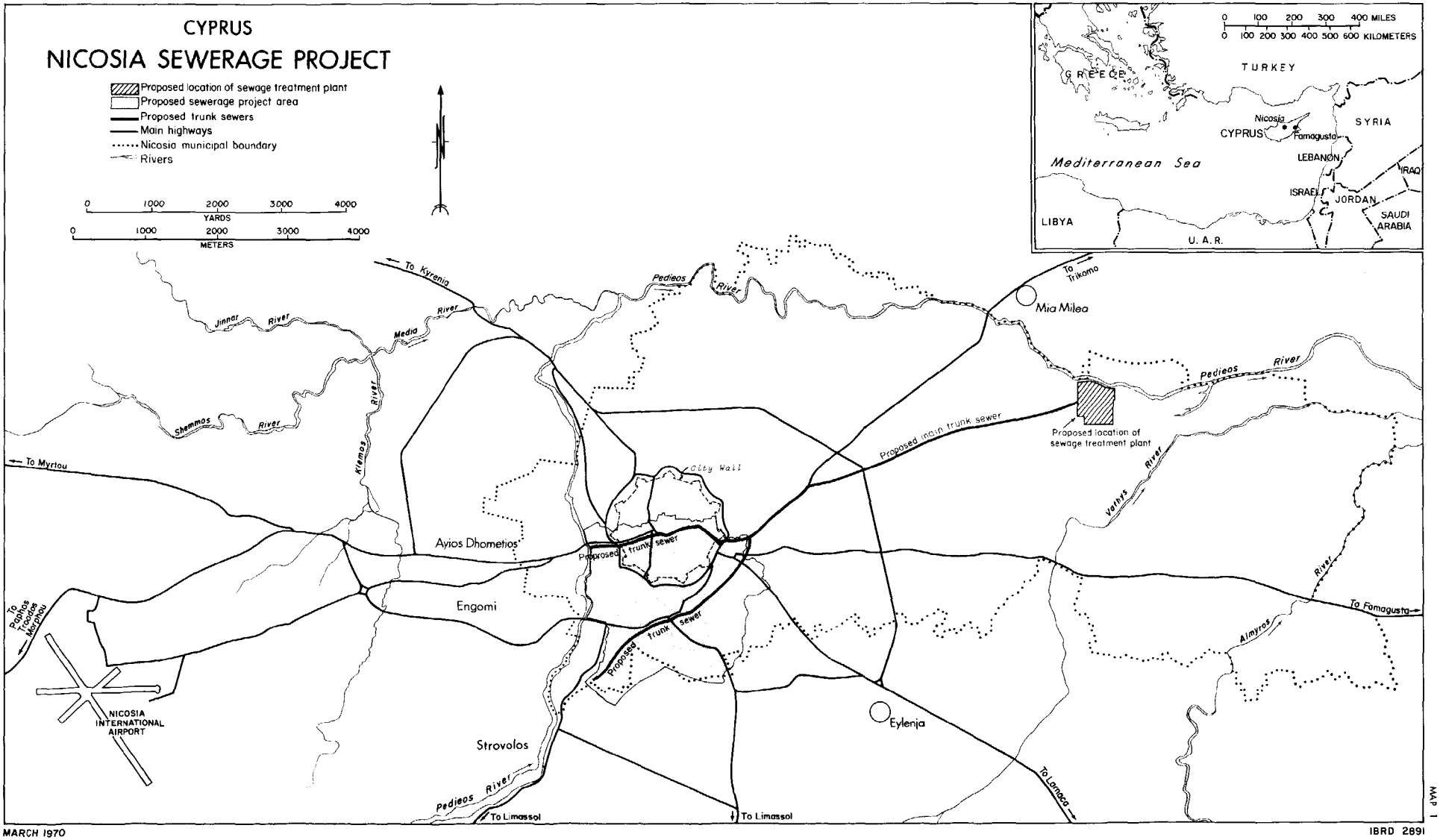
CYPRUS

NICOSIA SEWERAGE PROJECT

ESTIMATED SCHEDULE OF DISBURSEMENTS

IBRD Fiscal Year and Quarter	Cumulative Disbursement at end of Quarter (US$ 000)
1971-72	
September 30, 1971	58
December 31, 1971	136
March 31, 1972	502
June 30, 1972	868
1972-73	
September 30, 1972	1,158
December 31, 1972	1,448
March 31, 1973	1,833
June 30, 1973	2,219
1973-74	
September 30, 1973	2,509
December 31, 1973	2,800
March 31, 1974	3,005
June 30, 1974	3,210
1974-75	
September 30, 1974	3,355
December 31, 1974	3,500

March 9, 1971



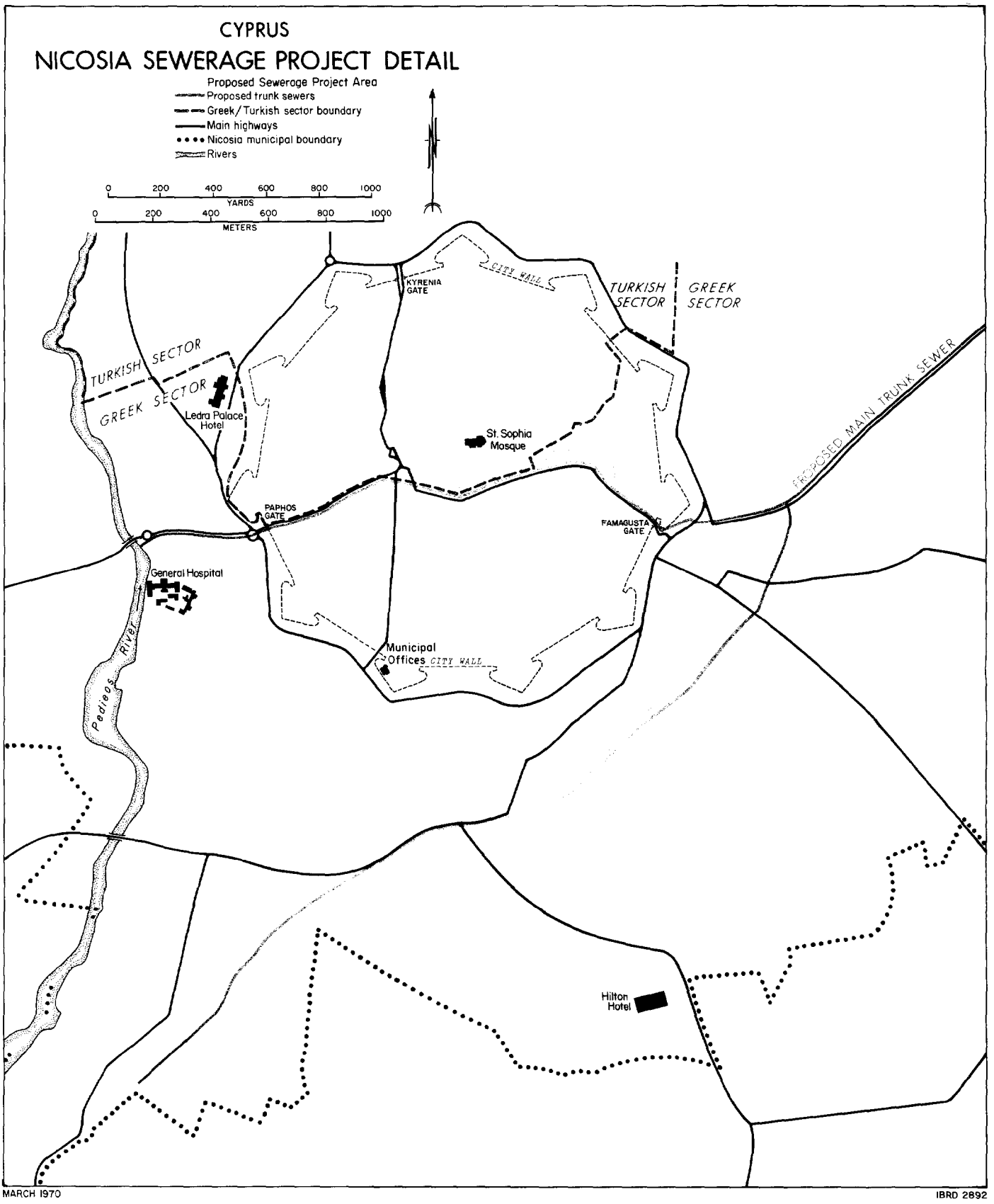
MARCH 1970

IBRD 2891

MAP 1

CYPRUS

NICOSIA SEWERAGE PROJECT DETAIL



MARCH 1970

IBRD 2892