

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

BRAZIL

LOAN TO THE STATE OF SÃO PAULO. WATER SUPPLY

(BR0011; BR0037)

LOAN PROPOSAL

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LOAN TO THE STATE OF SAO PAULO FOR THE JUQUERÍ PROJECT TO
EXPAND THE POTABLE WATER SUPPLY SYSTEM
FOR METROPOLITAN SAO PAULO

Table of Contents

	<u>Page</u>
SUMMARY	1
ANALYSIS OF THE APPLICATION	6
I. INTRODUCTION	6
II. THE BORROWER AND THE EXECUTING AND FINANCIAL AGENCY	8
The Borrower	8
Legal Capacity	8
Financial Situation	8
The Financial and Executing Agency	9
Identity and Date of Establishment	9
Domicile	9
Principal Line of Business	9
Legal Capacity	9
Financial Situation	10
Capital Structure	11
Assets, Reserves and Indebtedness	12
Administrative Capacity	12
Technical Capacity	13
Financial Capacity	13
III. THE PROJECT	14
Background	14
The Project	14
Complementary Works	15
Cost of the Project	16
Financing Plan	18
Source and Use of Funds	19
Previous Expenses	20
Investment Schedule	21
Local Contribution	22
Measures to Assure the Local Contribution	22
Execution of the Project	23
Background	23
Engineering and Supervision of the Project	23
Complementary Studies	24
Rules of the Acquisition of Goods and Services	25
Technical Assistance	25
Service Rates	27
Inspection and Supervision	28
Accounting and Auditing	29

	<u>Page</u>
IV. JUSTIFICATION OF THE PROJECT	30
Technical and Financial Feasibility	30
Economic Evaluation	32
V. CONCLUSIONS AND RECOMMENDATIONS	33

APPENDIXES

- A. Descripción del Proyecto
- B. Plan de Operaciones para Asistencia Técnica
- C. Law Establishing COMASP
- D. Curricula Vitae
- E. Cable from the Government of the State of São Paulo

ANNEXES

- I. Technical and Financial Report
- II. Economic Evaluation
- III. Parecer Jurídico

LOAN TO THE STATE OF SAO PAULO FOR THE JUQUERÍ PROJECT TO
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(BRAZIL)

S U M M A R Y

1. The Borrower and Executing Agency:

- a. The borrower would be the State of São Paulo.
- b. The executing and financial agent for the project would be the Companhia Metropolitana de Água de São Paulo (COMASP), a mixed company in which the State of São Paulo is the majority shareholder and which was established by Law No. 10,058 of February 7, 1968 to take over the collection, transmission, treatment and distribution of potable water to supply the urban conglomerate known as Greater São Paulo.

2. Amount and Currency:

US\$16.5 million 1/ of which up to US\$16.0 million would be disbursed in United States dollars and up to the equivalent of US\$500,000 in new cruzeiros.

3. Source of Funds:

- i. Up to the equivalent of US\$11.5 million from the ordinary capital resources of the Bank.
- ii. Up to US\$5.0 million from the resources administered by the Bank for the Government of Sweden. 2/

4. Terms, Interest, Commissions and Disbursements; Currencies of Payment:

a. Term:

- i. Resources of the Bank: 20 years.
- ii. Swedish resources: 25 years.

1/ Exchange rate: US\$1 = NCr\$3.2.

2/ Under an agreement signed between the Bank and the Government of Sweden on December 27, 1966.

b. Amortization:

- i. The resources of the Bank would be amortized in 33 equal and consecutive semiannual installments, the first of which would be paid 4 years after the date of the contract.
- ii. The Swedish resources would be amortized in 30 consecutive semiannual installments, the first of which would be paid 10-1/2 years after the date of the contract. The first 20 installments would cover 50% of the debt and the following 10 the balance thereof.

c. Interest: Payable semiannually as follows:

- i. Resources of the Bank: 7-3/4% per annum, including the special 1% commission of the Bank.
- ii. Swedish resources: 2% per annum.

d. Commission of Bank: Swedish resources: 1/2 of 1% per annum, payable semiannually on sums committed or on the balance due.

e. Commitment fee: Resources of the Bank: 1.25% per annum, payable semiannually.

f. Disbursement period: 3-1/2 years.

g. Currencies of payment: The payments of principal and interest will be made proportionally in the currencies disbursed. Payments of commission of the Bank on the Swedish resources and of the commitment fee will be made proportionally in the currencies stipulated in the contract.

5. Guarantee: The full guarantee of Brazil.

6. Description of the Project: The project consists in the enlargement of the potable water system now serving the metropolitan area of Greater São Paulo, with a population estimated at about 6,800,000 inhabitants.

This system is now fed by only 14 m³/second of water to supply about 53% of the aforementioned population. The project consists basically in the execution of works for the collection and transmission of about 10 m³/second of water from the Juquerí and Atibainha Rivers. It also includes pumps and treatment plants to handle this additional volume of water, and the equivalent and control instruments for operation of the system.

7. Cost of the Project: The total cost of the project would be the equivalent of about US\$82.0 million, distributed as follows: 1/

(In the equivalent of US\$1,000)

	Foreign exchange costs	Local costs	Total	%
Civil works <u>2/</u>	5,740	27,700	33,400	40.3
Pumps and treatment plants	2,810	31,740	34,550	42.1
Engineering for the project <u>3/</u>	1,150	1,850	3,000	3.7
Supervision (COMASP)	-	1,000	1,000	1.2
Administration	-	5,525	5,525	6.7
Complementary studies	-	1,390	1,390	1.7
Technical assistance	500	420	920	1.1
IDB inspection and supervision	300	-	300	0.4
Subtotal	10,500	4/69,625	79,825	97.3
IDB interest during construction	1,775	100	1,875	2.3
Total	12,275	69,725	82,000	100.0

8. Financing Plan: The financing plan would be as follows:

(In the equivalent of US\$1,000)

	IDB loan		Local Contribution		Total		
	Expenses in		Expenses in		Expenses in		
	Foreign	Local	Foreign	Local	Foreign	Local	Total
	exchange	currency	exchange	currency	exchange	currency	
Civil works	9,465 5/	-	2,075	21,900	11,540	21,900	33,440
Pumps and treatment plants	2,810	-	-	31,740	2,810	31,740	34,550
Engineering	1,150	500	-	1,350	1,150	1,850	3,000
Supervision (COMASP)	-	-	-	1,000	-	1,000	1,000
Administration	-	-	-	5,525	-	5,525	5,525
Complementary studies	-	-	-	1,390	-	1,390	1,390
Technical assistance	500	-	-	420	500	420	920
IDB inspection and supervision	300	-	-	-	300	-	300
IDB interest during construction	1,775	-	-	100	1,775	100	1,875
Total	16,000	500	2,075	63,425	18,075	63,925	82,000
	16,500		65,500		82,000		

1/ All items include an allowance of 10% for contingencies.

2/ Includes the works for the diversion of water from the Juquerí and Atibaína Rivers and the principal subconduits.

3/ Engineering studies would be prepared not only for the project itself, but also for phases scheduled for later execution.

4/ Total value of direct imports.

5/ Includes US\$3,725,000 to finance part of the indirect import expenses in foreign exchange, which are estimated at the equivalent of US\$5.8 million. (The remainder would be covered by the local contribution).

9. Source and Use of Funds: ^{1/} The source and use of the funds would be as follows:

(In the equivalent of US\$1,000)

	<u>Currencies of Origin</u>		<u>Currencies of Use</u>		<u>Total</u>	<u>%</u>
	<u>Cruzeiros</u>	<u>Foreign exchange</u>	<u>Cruzeiros</u>	<u>Foreign exchange</u>		
Ordinary capital resources	500	11,000	500	11,000 ^{2/}	11,500	14.0
IDB: Swedish re-sources ^{3/}	-	5,000	-	5,000	5,000	6.1
Local contribution (State of São Paulo)	65,500	-	63,425	2,075	65,500	79.9
Total	<u>66,000</u>	<u>16,000</u>	<u>63,925</u>	<u>18,075</u>	<u>82,000</u>	<u>100.0</u>
%	80.5	19.5	78.0	22.0	100.0	

10. Justification:

The present undersupply of potable water (in respect of consumers served and volumes distributed), aggravated by the extremely rapid urban growth of the Greater São Paulo region, justifies the drafting and execution of long- and short-term over-all programs to improve and increase the supply of potable water.

The project here considered constitutes the first phase of the short-run program prepared and put into execution by the agencies in charge of obtaining and distributing potable water with the financial backing of the State of São Paulo.

Completion of the works included in the project would raise the volume of water available at sources to 24 m³/second, which would supply about 2,000,000 more inhabitants, and thereby make it possible to supply up to 72% of the metropolitan population.

The project has been designed to benefit primarily the population in the northern and western parts of the metropolitan area, which consists mostly of low-income groups. ^{4/}

^{1/} All the member countries of the International Monetary Fund and Switzerland would be eligible to supply the goods and services to be purchased with resources from the loan.

^{2/} Includes US\$3,725,000 to finance part of the indirect import expenses in foreign exchange, which are estimated at the equivalent of US\$5.8 million. (The remainder would be covered by the local contribution).

^{3/} Would be utilized in their entirety to purchase goods and services abroad.

^{4/} This population has accumulated mainly through migration from, chiefly, the northeastern part of the country.

Execution of the project would help improve environmental sanitation of the served population and thereby reduce absenteeism due to water-borne diseases which, in turn, could contribute to raising the gross regional product and, by extension, the living standard of the population in the region.

When the execution of the project has been completed, an estimated 23% of the water added to the system by it will be allocated to increase the supply for industrial consumption, possibly at a lower cost than that at which industry is compelled to supply itself at present by the failure of the public authorities to provide for its needs. Desirable industrial growth would thus be encouraged by the following benefits:

- a. Partial elimination of one of the limiting factors of industrial growth,
- b. Reduced production costs from the availability of a greater and cheaper supply of water for industrial consumption, and
- c. Improved quality of the water.

Recommendation

On the basis of the conclusion by the Project Committee that the project is technically, economically and financially justified, the Operations Department submits this loan document to the President of the Bank for consideration and subsequent presentation of the following proposed resolutions to the Board of Executive Directors for approval.

ANALYSIS OF THE APPLICATION

I. INTRODUCTION

- 1.01 In June 1967, when an IDB Mission visited Brazil, representatives of the Secretaria de Obras e Serviços Públicos and of the Departamento de Águas e Esgotos (DAE) of the State of São Paulo inquired into the possibility of financial assistance in the execution of the first stage of the program to expand the potable water supply system serving metropolitan São Paulo.
- 1.02 At this time the DAE presented a feasibility study on the project, then partly done, to the Bank for consideration.
- 1.03 In September 1967 authorities of the Federal Government advised the Bank that they attached high priority to this project within the development plans of the country, and particularly within the Government's Three-year (1968-1970) Plan. 1/
- 1.04 In September 1967 the DAE presented to the IDB its formal application of a loan for the first stage of the project, supported by a more complete study prepared by a firm of independent consultants. 2/
- 1.05 During November-December 1967 an IDB mission went to São Paulo to inspect the works in progress, to define the project more specifically and to establish the basis on which the requested financial assistance might be provided.
- 1.06 As a result of technical and administrative observations, it was agreed to redraft the project as initially presented to focus, during the first stage of execution, on increasing the volume of water at sources and, in addition, to determine which agencies would be in charge of executing the works and of administering the water supply and distribution systems.
- 1.07 In late January and early March this year representatives of the DAE and the State of São Paulo came to Washington to conclude the negotiations for the eventual IDB loan and to complete the information needed for analysis of the loan application.

1/ Diretrizes de Governo, Programa Estratégico de Desenvolvimento, July 1967.

2/ Serete S.A. Engenharia de São Paulo.

- 1.08 In a letter of February 7, 1968 the Government of Sweden was asked whether it would be interested in having part of the project financed with resources from the Swedish Fund for the Development of Latin America administered by the Bank.
- 1.09 On March 8 word was received from the Swedish Government that it was prepared to approve participation in the financing of the project in accordance with the terms of the agreement signed by the Bank on December 27, 1966 to establish that fund.

II. THE BORROWER AND THE EXECUTING AND FINANCIAL AGENCY

The Borrower

- 2.01 The borrower would be the State of São Paulo.

Legal Capacity

- 2.02 According to the Legal Report (Annex III), the State of São Paulo has legal personality and the capacity to contract the eventual loan if so authorized by the State Legislative Assembly and the Federal Senate.

Financial Situation

- 2.03 As stated in greater detail in the Technical-Financial Report (Annex I), the budgetary performance of the State of São Paulo over the last three years was as follows:

(In the equivalent of US\$1,000)

	<u>1965</u>	<u>1966</u>	<u>1967</u>
Current income	638,047	868,250	1,082,266
Current expenditures	<u>637,779</u>	<u>784,392</u>	<u>1,057,290</u>
Current surplus	268	83,858	24,976
Capital income (Federal Government transfers)	48,745	54,510	45,449
Expenditures on capital account	<u>279,311</u>	<u>255,865</u>	<u>210,825</u>
Deficit	<u>230,298</u>	<u>117,497</u>	<u>140,400</u>

- 2.04 It can be seen that, during the years shown, current expenditures were amply covered by current income. On the other hand, because of an extraordinary capital investment effort on which the State of São Paulo is now embarked, expenditures on capital account exceeded income and led to deficits during the three reporting periods.
- 2.05 It may be noted that those deficits do not accumulate, but are financed with short-term bank credits and canceled by appropriations on the budget for the following year.
- 2.06 In general, this indebtedness to banks is not very significant, as can be clearly seen from an analysis of the figures on its annual service (see the Technical-Financial Report). It will be noted that expenditures in amortization of the debt have fallen off from 0.27% of capital expenditures in 1965 to 0.04% in 1967 and that interest payments on the debt have declined from 0.11% of current expenditures in 1965 to 0.07% in 1967.

The Financial and Executing Agency

- 2.07 The Companhia Metropolitana de Água do Estado de São Paulo (COMASP) was established by the State of São Paulo to reorganize and restructure the present water supply service, and also to apply principles of administrative and operational specialization. This agency would take charge of the execution of the project and act as the financial agent of the State of São Paulo in relation to the loans.

Identity and Date of Establishment

- 2.08 COMASP was established on February 7, 1968 by State Law No. 10,058 (see Appendix C) as a stock company subject to the Law on stock companies. This law prescribes that the State of São Paulo must hold majority control of the shares. 1/

Domicile

- 2.09 The domicile of COMASP is the city of São Paulo, capital of the state of the same name.

Principal Line of Business

- 2.10 According to its establishing law, the functions of COMASP are to plan, construct, operate and maintain the systems for the collection, transmission, treatment and delivery of potable water to the agencies responsible for its household distribution (DAE and the municipal governments). 2/ The operating territory of COMASP includes the city of São Paulo and 11 neighboring municipalities, designated collectively as Greater São Paulo.

Legal Capacity

- 2.11 According to the Legal Report, COMASP has sufficient legal personality and legal capacity to execute the project, manage and operate the potable water systems in its charge, and to set the prices 3/ for the sale of the potable water it delivers to the distribution systems.

1/ The State is represented in COMASP by the Departamento de Águas e Energia Elétrica (DAEE) and the Departamento de Águas e Esgotos (DAE).

2/ Up to the date on which COMASP was established, the DAE was in charge of the entire system. It has been scheduled that responsibility for the administration and operation of the existing systems is to be transferred gradually from DAE to COMASP starting in 1970.

3/ In accordance with the law (see the Legal Report).

Financial Situation

2.12 The opening balance sheet 1/ of COMASP was as follows, as of March 20, 1968:

<u>Assets</u>	Equivalent in thousands of US\$	%
<u>Fixed assets</u>		
Goods, properties, etc. <u>2/</u>	5,841.9	18.7
<u>Current Assets</u>		
Cash <u>3/</u>	2,540.8	8.1
<u>Other Assets</u>		
Shareholders (receivable during 1968):		
Departamento de Água e Energia Elétrica	22,866.8	73.2
Others	0.5	-
Total Assets	<u>31,250.0</u>	<u>100.0</u>
<u>Liabilities</u>		
<u>Net worth</u>		
Subscribed capital	22,867.3	73.2
Paid-in capital	8,382.7	26.8
Total Liabilities	<u>31,250.0</u>	<u>100.0</u>

1/ Will be published in the Official Gazette of the State of São Paulo as a point of departure for the operations of COMASP.

2/ Includes the value of the studies, designs, plans and other engineering services relating to the Juquerí Project and the value of the executed works, transferred in a body from the DAE to COMASP.

3/ Initial subscription of shares by the DAEE.

Capital Structure

- 2.13 The initial capital of COMASP is NCr\$100 million (the equivalent of US\$31,250,000) divided into shares of NCr\$10 face value each.
- 2.14 The shares in COMASP now held by the State were subscribed by:
- i. The Departamento de Água e Energia Elétrica (DAEE) in cash 1/ and
 - ii. The Departamento de Águas e Esgotos (DAE), by transfer of the studies and works for the Juquerí project. 2/
- 2.15 So far, the DAEE has made an initial subscription of COMASP shares in the equivalent of US\$2.54 million. The DAEE is to complete its subscription of up to the equivalent of US\$25,407,600 during 1968.
- 2.16 According to Article 12 of the law establishing COMASP (see Appendix C), the State Government is authorized through the Departamento de Água e Energia Elétrica (DAEE) and the Departamento de Águas e Esgotos (DAE), to subscribe an additional amount of up to NCr\$200 million in COMASP shares during 1969-1970 either in cash or by transfer of properties.
- 2.17 The law that would authorize the State to contract the proposed loan from the Bank (see the Legal Appendix) would establish that the DAEE is to subscribe enough additional capital in COMASP shares to complete the local contribution to the project, estimated at the equivalent of US\$65.5 million.
- 2.18 According to the law establishing COMASP, municipal governments, municipal enterprises and private persons or enterprises could subscribe shares aggregating up to 49% of the total. 3/ The law allows the subscription of shares by private investors, chiefly to conform the structure of COMASP to the administrative criteria of an autonomous agency. However, private capital is not expected to subscribe shares up to the stated limit because this is a public utility whose operations will depend heavily on capital contributions from the State of São Paulo.

1/ These resources will be used to execute the project described in this document.

2/ The DAE will subscribe new shares of COMASP by successive transfers of the installations and equipment it now operates for the collection, transmission pumping and treatment of potable water in the system.

3/ So far, the equivalent of only US\$500 has been subscribed in private capital.

Assets, Reserves and Indebtedness

- 2.19 As shown in the Opening Balance Sheet of COMASP, the fixed assets of this agency consist solely of properties transferred by the DAE. These assets would increase with the transfer, in 1970, of the DAE works and installations described in foregoing paragraphs.
- 2.20 The current assets would be increased during 1968 by the equivalent of US\$22.9 million (see paragraph 2.15), which is viewed as adequate to cover all current expenditures and the outlays for execution of the Juquerí project this year.
- 2.21 As this agency has only just been established, it does not yet have any reserves or outstanding debts, and can only begin to acquire them when it takes over the operation of the systems.

Administrative Capacity

- 2.22 The above circumstances rule out any evaluation of the administrative capacity of COMASP for the time being. Moreover, as was brought out in earlier paragraphs, COMASP will take up the management and operation of the existing systems in 1970, and will therefore be able systematically to build up an adequate structure, especially with the technical assistance that would be extended to it starting in 1968.
- 2.23 It may be noted that COMASP already has a managerial group and technical-administrative team qualified to take over the execution of the project, especially in relation to the eventual loans, discussed in this document. Three of the four directors prescribed by law, including the President-Director of the agency, have been appointed (see Appendix D, Personal Histories).
- 2.24 The technical-administrative team consists of technicians and officers transferred from the DAE and who have been associated with the works of the Juquerí system since their initiation. ^{1/} Therefore, it may be expected that the project will be executed efficiently and, of course, without interruption of the construction process.
- 2.25 The key members of the aforementioned technical-administrative staff are as follows:
- 1 chief engineer and 17 engineers, all with more than 10 years of experience in the collection, transmission and treatment of water;

^{1/} It may be noted here that, although the Brazilian authorities saw it fit to establish COMASP to take over the management of part of the system formerly run entirely by the DAE, the technical staff of the latter agency is regarded as of high professional quality.

- 1 economist
- 6 topographers
- 6 draftsmen
- 3 accountants.

- 2.26 To assure the functional effectiveness of this cadre COMASP will continue to receive the cooperation and guidance of the technicians on the staff of the Department of Works and Services of the State of São Paulo and, if necessary, would hire qualified personnel elsewhere.
- 2.27 Concurrently with the execution of the project, a thorough study will be made of the administrative, operational and accounting organization of COMASP by consultants specializing in this field (see the Plan of Technical Assistance Operations, Appendix B).
- 2.28 As the consultants progress with the study, COMASP will gradually and systematically adopt the recommendations of that study to accomplish the proper organization of its services.

Technical Capacity

- 2.29 COMASP is expected to have the technical capacity to execute the project, since, as previously explained, its technical and administrative positions have been filled with personnel with broad professional experience, from the DAE.
- 2.30 This technical capability would be complemented by consultants who would be hired to perform the engineering for the project and to supervise the execution of the works, under the responsibility and for the account of COMASP.

Financial Capacity

- 2.31 As established in the Technical-Financial Report, analysis of the financial situation of COMASP and the projections thereof show that this situation would allow the satisfactory fulfillment of all the obligations deriving from the execution of the project, on the basis of the contributions to be made by the State of São Paulo.

III. THE PROJECT

Background

- 3.01 The rapid growth of São Paulo, especially in recent years, has outstripped the capability of the present potable water system to supply this commodity in the requisite quantity and quality. Indeed, the flow of 14 m³/second obtained from present sources supplies only 53% of the population, estimated at 6.8 million inhabitants.
- 3.02 To correct the grave inadequacy of the system and to search for a long-term solution that would take account of the high annual rate of population growth in São Paulo (this rate rose from 5.9% to 8.2% during the period 1961-1967), the State decided to establish the Comissão Especial do Planejamento de Abastecimento de Água da Cidade de São Paulo (Special Committee to plan the water supply of the city of São Paulo) to prospect and study probable water sources that might assure an adequate supply up to the year 2,000.
- 3.03 The conclusions of the studies made by this committee have crystallized in a program that consists essentially in:
- i. The construction of the civil works needed to tap the waters of the Juquerí, Atibainha, Cachoeira and Jaguaré Rivers, affluents of the Tietê River;
 - ii. Interconnection of the transmission lines from those four sources;
 - iii. The corresponding pumping stations and force mains;
 - iv. The storage facilities, their respective filtration and treatment plants, and lastly,
 - v. The expansion of the distribution systems in the different districts of the city of São Paulo and its environs, most particularly in the northern district, where there is almost no potable water supply.
- 3.04 This works program has been divided for purposes of execution into several stages which provide, initially, for the solution of the more urgent problems, adequate use of the available local resources, and eventual foreign financial assistance.

The Project

- 3.05 The project described in this document constitutes the first stage of that program and includes:
- collection works: dams on the Atibainha and Juquerí Rivers and a tunnel to connect the water storage facilities;

- conduits: canals, tunnels and a pumping plant to convey the water to the treatment plant;
 - a plant for the treatment of 11 m³ of water per second;
 - storage tanks for treated water;
 - two aqueducts to convey the water to the different districts of Greater São Paulo for distribution within them.
- 3.06 Execution of this project would partly solve the present water shortage, estimated at about 14 m³/second, which implies a supply of 400 liters per day/inhabitant for 85% of the present total population of the metropolitan area of Greater São Paulo. ^{1/} The remaining 15% lives in fringe or rural areas which, it is believed, can be supplied only by independent systems.
- 3.07 Of the 10 m³/second that would be added to the present system, 1.7 m³/second would be used to increase the water supply of the population in the southern zone, 6.0 m³/second would be distributed in the northern and western zones, where water restrictions are most severe, and the remaining 2.3 m³/second would fill part of the needs of São Paulo industry. In short, the additional water that would be made available upon completion of the project would supply the needs of 2 million inhabitants in addition to those supplied at present.
- 3.08 The conduits, pumping and treatment plants and other works to be executed in the first stage have been designed to accommodate the increases in water volumes that will result from the execution of subsequent stages.

Complementary Works

- 3.09 The present project does not specifically call for construction of the distribution network because it is under the jurisdiction and responsibility of the DAE. However, arrangements have been made to provide the Bank with a study on this network, based on a survey to be made of needs in the different zones, and showing especially the zones to be served first under a plan for the improvement and extension of the existing network. This plan would also include a financing plan and guarantees that the local contribution for the execution of that project would in fact be made (see 5.01 2 (a)).
- 3.10 The technical assistance envisaged as part of the loan would facilitate the accomplishment of the aforementioned undertaking as the plan of operations for this assistance includes an item for the hiring of consultants to perform the study for that network (see Appendix B).

^{1/} Execution of the subsequent stages of the program would gradually cover the remaining shortage plus the additional potable water requirements generated by population growth. (The shortage is expected to increase not less than 1 m³/second per year.)

- 3.11 In regard to the sewer system, the information received indicates that it is in poor condition, that, on the whole, it has not been developed systematically and that, moreover, large sectors of the population (an estimated 70%) are not provided with this service.
- 3.12 An over-all study offering several alternative solutions to the sewerage problem in Greater São Paulo has been virtually completed. The São Paulo State authorities have expressed their intention to undertake the execution of the projects emerging from this study in a systematic and progressive manner by dividing it into several stages that are geared to needs and the available local resources. Part of the resources needed to finance the sewer system would be obtained by application of Law No. 9,578 of December 30, 1966, which imposes a tax on the value added to urban property by these services and, in addition, from collection for sewerage charges. 1/
- 3.13 The chapter on Conclusions and Recommendations establishes the obligation of the debtor to present to the Bank for consideration, within one year after the date of the contract, a plan of works for the improvement and extension of the sewer system in, at least, the urban areas to which water will be distributed as a result of execution of the project, and showing how these works would be financed.

Cost of the Project

- 3.14 The total cost of the project is estimated at the equivalent of US\$82 million, distributed as shown in the following table: 2/

1/ The current rates for sewer service are 50% higher than those for the same volume of potable water supplied.

2/ All items include an allowance of about 10% for contingencies.

(In the equivalent of US\$1,000)

	Foreign exchange cost	Local cost	Total	%
Atibainha Collection Works	2,240	11,960	14,200	17.3
Juqueri Collection Works	-	7,900	7,900	9.6
Pumping Plant	1,900	1,650	3,550	4.3
Treatment Plant	910	30,090	31,000	37.8
Aqueducts	3,500	7,840	11,340	13.9
Engineering for the Project	1,150	1,850	3,000	3.7
Supervision of the Project (COMASP)	-	1,000	1,000	1.2
Administration	-	5,525	5,525	6.7
Complementary Studies	-	1,390	1,390	1.7
Technical Assistance	500	420	920	1.1
IDB Inspection and Supervision	300	-	300	0.4
Subtotal	10,500 <u>1/</u>	69,625	80,125	97.7
Interest on IDB Loans during Construction	<u>1,775</u>	<u>100</u>	<u>1,875</u>	<u>2.3</u>
TOTAL	<u>12,275</u>	<u>69,725</u>	<u>82,000</u>	<u>100</u>

1/ Total value of direct imports.

Financing Plan

3.15 The project would be financed as shown in the following table: 1/

(In the equivalent of US\$1,000)

	<u>IDB Loan</u>		<u>Local Contribution</u>		<u>Total</u>		<u>Total</u>
	<u>Expenses in</u> <u>Foreign</u> <u>exchange</u>	<u>Local</u> <u>currency</u>	<u>Expenses in</u> <u>Foreign</u> <u>exchange</u>	<u>Local</u> <u>currency</u>	<u>Expenses in</u> <u>Foreign</u> <u>exchange</u>	<u>Local</u> <u>currency</u>	
Atibainha Col- lection Works	2,240	-	-	11,960	2,240	11,960	14,200
Juquerí Collec- tion Works	1,850	-	-	6,050	1,850	6,050	7,900
Pumping Plant	1,900	-	-	1,650	1,900	1,650	3,550
Treatment Plant	910	-	-	30,090	910	30,090	31,000
Aqueducts	5,375	-	2,075	3,890	7,450	3,890	11,340
Engineering for the Project	1,150	500	-	1,350	1,150	1,850	3,000
Supervision of the Project (COMASP)	-	-	-	1,000	-	1,000	1,000
Administration	-	-	-	5,525	-	5,525	5,525
Complementary Studies	-	-	-	1,390	-	1,390	1,390
Technical Assistance <u>2/</u>	500	-	-	420	500	420	920
IDB Inspection and Supervision	300	-	-	-	300	-	300
Interest on IDB Loans during Construction	<u>1,775</u>	<u>-</u>	<u>-</u>	<u>100</u>	<u>1,775</u>	<u>100</u>	<u>1,875</u>
TOTAL	<u>16,000</u>	<u>3/ 500</u>	<u>2,075</u>	<u>63,425</u>	<u>18,075</u>	<u>63,925</u>	<u>82,000</u>
	<u>16,500</u>		<u>65,500</u>		<u>82,000</u>		

1/ All figures include an allowance of 10% for contingencies.

2/ See the plan of operations (Appendix B).

3/ Includes US\$3,725,000, which would be used to finance part of the indirect import expenses in foreign exchanges, which are estimated at the equivalent of US\$5.8 million altogether.

3.16 Source and Use of Funds:

(In the equivalent of US\$1,000)

	<u>Currencies of Origin</u>		<u>Currencies of Use</u>		<u>Total</u>	<u>%</u>
	<u>Cruzeiros</u>	<u>Foreign exchange</u>	<u>Cruzeiros</u>	<u>Foreign exchange</u>		
Ordinary capital						
IDB: resources	500	11,000	500	11,000	1/11,500	14.0
Swedish resources	-	5,000	-	5,000	5,000	6.1
Local contribution (State of São Paulo)	65,500	-	63,425	2,075	65,000	79.9
TOTAL	66,000	16,000	63,925	18,075	82,000	100
%	80.5	19.5	78.0	22.0	100	

- 3.17 The Swedish resources (US\$5 million) would be used to cover part of the value of direct imports for the project 2/, part of the costs of inspection and supervision for the Bank, and the interest on the Swedish loan during the period of execution of the project.
- 3.18 Of the ordinary capital resources of the IDB loan, US\$7,275,000 would be used to pay for the balance of the goods and services to be acquired abroad including part of the expenses of inspection and supervision for the Bank and the interest on the loan during the execution period. The remaining US\$4,225,000 from the ordinary capital would be utilized to cover costs in local currency, and the equivalent of US\$500,000 of that balance would be disbursed in cruzeiros. 3/
- 3.19 It should be borne in mind that the direct expenditures in foreign exchange would add up to US\$12,275,000 (US\$10.5 million in direct imports and US\$1.775 million for the foreign exchange service on the

-
- 1/ Includes US\$3,725,000, which would be used to finance part of the indirect import expenses in foreign exchange, which are estimated at the equivalent of US\$5.8 million altogether.
- 2/ All the member countries of the International Monetary Fund and Switzerland would be eligible to supply goods and services to be purchased abroad.
- 3/ These resources would be provided for the hiring of local consulting firms which will work in association with foreign firms for purposes of the engineering of the project.

debt during the construction period), and, moreover, that the estimated value of indirect imports generated by execution of the project would come to about US\$5.8 million. 1/

Previous Expenses

- 3.20 Expenditures totaling the equivalent of about US\$1.8 million 2/ have been incurred since the date of the application as shown in the following table:

(Equivalent in thousands of US\$)

	<u>Total cost</u>
Engineering services	150
Civil construction (dams and tunnels)	950
Administration	250
Construction machinery	<u>450</u>
Total	<u>1,800</u>

- 3.21 The value of the aforementioned works in progress, which amounts at present to barely 2.2% of the total cost of the project, could, after examination and acceptance by the Bank, be considered as part of the local contribution to the project.

1/ The following table itemizes the value of the indirect imports (See the Technical-Financial Report):

	<u>Equivalent in thousands of US\$</u>
Depreciation of construction equipment acquired for the Juquerí collection works	1,850
Cost of imported component for local fabrication of the steel plate and asphalt for the aqueducts	3,100
Imported component of fuels and lubricants	<u>850</u>
Total	5,800

2/ It is estimated that, by the time the contract is signed, this figure could rise to the equivalent of US\$3.3 million.

Investment Schedule

INVESTMENT SCHEDULE (Equivalent in thousands of US\$)

	Year 1		Year 2		Year 3		Year 4 (months)		Total		Total
	São Paulo		São Paulo		São Paulo		São Paulo		São Paulo		Total
	IDB	Paulo	IDB	Paulo	IDB	Paulo	IDB	Paulo	IDB	Paulo	Total
collection works	360	1,175	1,270	4,150	220	525	-	200	1,850	6,050	7,900
ha collection works	450	950	875	7,500	450	3,510	465	-	2,240	11,960	14,200
plant	310	460	750	750	640	440	200	-	1,900	1,650	3,550
at plant 1/	300	6,050	185	15,640	365	8,250	60	150	910	30,090	31,000
as	825	50	1,605	3,290	2,475	2,235	470	390	5,375	5,965	11,340
ing for the project	500	200	500	700	500	400	150	50	1,650	1,350	3,000
ion of the project (COMASP)	-	250	-	300	-	300	-	150	-	1,000	1,000
ration	-	1,680	-	1,680	-	1,965	-	200	-	5,525	5,525
ntary studies	-	300	-	840	-	250	-	-	-	1,390	1,390
l assistance	175	125	175	125	75	85	75	85	500	420	920
on and supervision	75	-	75	-	75	-	75	-	300	-	300
rest	130	10	430	25	750	40	465	25	1,775	100	1,875
total	3,125	11,250	5,865	35,000	5,550	18,000	1,960	1,250	16,500	65,500	82,000
%	19.0	17.2	35.5	53.4	33.6	27.5	11.9	1.9	100	100	
	14,375		40,865		23,550		3,210		82,000		
%	17.5		49.8		28.7		4.0		100.0		

contract now in execution is for the excavation and preparation of the site. The IDB funds are for eq
indirect imports..

Local Contribution

- 3.23 According to the financing plan and investment calendar, the local contribution needed for the complete execution of the project comes to the equivalent of US\$65.5 million, for distribution during the construction period as follows:

(Equivalent in thousands of US\$)

		<u>%</u>
1968	11,250	17.2
1969	35,000	53.4
1970	18,000	27.5
1971	<u>1,250</u>	<u>1.9</u>
	<u>65,500</u>	<u>100.0</u>

- 3.24 This contribution would come from the subscription of COMASP shares by the State of São Paulo, which it would pay for in cash through the Departamento de Águas e Energia Elétrica (DAEE).

Measures to Assure the Local Contribution

- 3.25 The provisions in the law establishing COMASP (Article 13) and those included in the bill of law to be approved, authorizing the State of São Paulo to sign the loan contracts, would constitute sufficient assurances that the local contribution to the execution of the project would be available on schedule in more than the amounts estimated as needed during the execution period.
- 3.26 Indeed, the aforementioned establishing law authorizes the State of São Paulo to open credits in favor of the DAEE so that it may during 1968 subscribe up to the equivalent of US\$28.1 million in COMASP shares.
- 3.27 Moreover, the aforementioned bill of law to authorize the signing of the eventual contract establishes that, in addition to what is said in the law establishing COMASP, during 1968 the Executive Branch will subscribe through the DAEE such additional increases in the capital of COMASP as are needed to provide it with all the financial resources required for execution of the project (see the Legal Report, Appendix I).
- 3.28 Article 4 of the same bill of law further authorizes the State of São Paulo to subscribe specified additional sums to complete the local contribution for execution of the project during the period 1969/1971 in the amounts estimated in the present document.
- 3.29 It follows from the foregoing that the sums provided in the abovementioned laws would not only assure the contribution of resources which, as a whole, would comfortably exceed the requirements estimated for the period

1968/1971, but would also cover, if necessary, such higher costs as might be generated by eventual changes in the project or in the exchange rate.

Execution of the Project

Background

- 3.30 The general plan and the engineering studies for the works under the project were developed by the DAE with the help of consulting specialists in the field.
- 3.31 On the basis of these studies and with financial support from the State of São Paulo, four construction firms were hired in late 1966 1/ and began the civil works for the Juquerí dam, the treatment plant and some sections of the projected tunnels and canals.
- 3.32 To continue the formulation of basic criteria for the works program, the obtaining of technical data, the performance of topographical and hydrological studies and to supervise the execution of works under contract, in April 1967 2/ the DAE hired a firm of consultants who are now engaged in these tasks.

Engineering and Supervision of the Project

- 3.33 To assure fulfillment of the calendar for execution of the works, it has been foreseen that several firms of consulting specialists will have to be hired to take over, among others, the following concurrent tasks relating to the various works under the project which need to be programmed, contracted for and executed:
- The preparation of plans and designs for the works.
 - The computation of costs and budgets.
 - The formulation of specifications, preparation of bidding documents, studies and the awarding of contracts for works and for the acquisition of equipment.
 - Control of procurement and verification of the quality of the materials and equipment.
 - Progress reports on the works.
- 3.34 Up to US\$1.65 million would be allocated from the loan resources for the hiring of the consultants to help engineer the projects. Of this amount, US\$1.15 million would be used to pay for services abroad and the balance

1/ Only the works which have been executed since September 1967 would be regarded as part of the project and their cost as a local contribution to it.

2/ Only the consulting services hired since September 1967 would be regarded as part of the project and their cost as a local contribution to it.

in the local currency equivalent of US\$500,000, to hire local services. In addition, the local contribution for the engineering of the project has been set at the equivalent of US\$1.35 million.

- 3.35 The Technical-Financial Report shows that, in view of the magnitude and complexity of the works, the execution period, the number of independent consultants who would work concurrently on the project, and other circumstances, if the execution of the project is to conform to the established timetable, it will be necessary that, prior to the first disbursement, COMASP hire a firm of consultants which, in addition to taking charge of the planning and programming of the works, would chiefly exercise over-all supervision and control of the project for account of COMASP. This consulting firm would complement the work of the various specialized firms that would be hired to perform the tasks described in paragraph 3.33, and would also assist in the solution of such technical problems as might arise during the execution of the works. In this connection, it would make recommendations to COMASP and to the borrower in relation to the development of the works.
- 3.36 The terms of reference would be adopted and the firm of consultants to supervise and coordinate the project would be hired with prior approval from the Bank. The cost of these services would come to the equivalent of US\$1,000,000 and be paid out of the local contribution.
- 3.37 The expected cost of the engineering and supervision of the project, mentioned in paragraphs 3.33 and 3.35, comes to 4.4% of the cost of executing the project. This percentage could be viewed as reasonable since some of the studies and engineering services to be performed with these resources would also be used in later phases of the program for expansion of the potable water systems of São Paulo.

Complementary Studies

- 3.38 With a view to the improvement and expansion of the DAE distribution systems, on whose efficient operation the success of the project subject of the present document would largely depend, it has been anticipated that consultants will have to be hired, with resources from the local contribution, to:
- i. perform a cadastral survey in the city of São Paulo and the municipalities served by the DAE to determine the number and nature of water users and to gather the information needed to establish a rate structure and to improve the DAE billing and collection systems;
 - ii. to review the existing rate structure and propose changes whereby to obtain income from the sale of water to users which, as a whole, may yield enough funds to cover all the administrative, operating and maintenance expenses, interest, depreciation and amortization of nondepreciable items corresponding to the aforementioned distribution systems;

- iii. prepare a financial and economic feasibility study and a project for the improvement and expansion of the São Paulo water distribution network, including the financing and execution plans.
- 3.39 The cost of hiring the consultant services described in the foregoing paragraph would be covered out of the local contribution and come to the equivalent of US\$1,390,000, as follows:

(Equivalent in thousands of US\$)

Cadastral survey	515
Rate structure review	55
Preparation of distribution network project	<u>820</u>
Total	1,390

Rules for the Acquisition of Goods and Services

- 3.40 Machinery, equipment and other goods relating to the program would be acquired and contracts for the execution of works awarded by the public bidding system in all cases in which the value of those acquisitions or contracts exceeded the equivalent of US\$20,000, and the procedure for such bidding would be subject to approval by the Bank, taking account of the applicable Brazilian legislation. The experience of the Bank in other operations indicates that there would be no impediment to the establishment of these conditions.
- 3.41 It may be mentioned that goods and services of foreign origin financed with resources from the Bank loans could be acquired in all the member countries of the International Monetary Fund and Switzerland, subject to the applicable rules of the Bank. 1/

Technical Assistance 2/

- 3.42 Earlier chapters established the need and advisability of giving special attention to the organization and structuring of COMASP, especially in view of the magnitude and complexity of the operations it will handle.

1/ These rules establish, i.a., the obligation to publish the bidding announcements at least three times in the magazines and newspapers of largest circulation in the debtor country, and to send circular letters to the embassies of those countries in which the terms of the invitations to bid are made known with the same details given in the press announcement.

2/ See the Plan of Technical Assistance Operations, Appendix B.

- 3.43 Furthermore, to assure the efficient distribution of an adequate supply of water, and in view of the shortcomings of the present administrative, accounting and operating systems of the DAE (see the Technical-Financial Report), it has been agreed that the Bank should assist the State of São Paulo in its current efforts to restructure the enterprise as the only way to complement and maximize the benefits from execution of the project.
- 3.44 It can be seen, moreover, that the distribution networks 1/ are now in poor condition, chiefly due to widespread losses, lack of pressure, deterioration of pipelines, and a lack of meters and control equipment. To remedy these shortcomings, it is indispensable that a methodical study be made to identify defects and work out an appropriate program of improvements.
- 3.45 Because of the scale of the potable water systems supplying São Paulo, it has been thought advisable either to hire foreign consultants of demonstrated capacity and experience to perform these tasks or to hire local consultants associated with foreign firms.
- 3.46 In view of the foregoing, one of the purposes of the eventual loans is to provide the technical assistance needed for:
- i. Advisory services in the administrative, operational and accounting organization of COMASP and in the reorganization of the DAE to optimize the management of the water collection, treatment and distribution systems operated by those agencies.
 - ii. The organization of regular and advanced training courses and the provision of study grants for selected COMASP and DAE personnel, as a complement to the advisory services described at (i), above; and
 - iii. The performance of a study to ascertain the losses and pressure differences in the distribution systems and to obtain the information needed to prepare the programs for the improvement and expansion of those systems, with priority attention to the northern zone of the city.
- 3.47 The cost of this technical assistance has been estimated at US\$920,000. According to the proposed financing plan, 54.3% of this total would be covered with resources from the eventual loans.
- 3.48 The loan contracts would contain clauses to assure that COMASP and the DAE will implement on schedule the recommendations emerging from the studies to be financed under this technical assistance.

1/ The distribution networks are not covered by the project, although, of course, they would be directly affected by it.

Service Rates

- 3.49 The technical, economic and financial reports establish from historical data that, up to 1966, receipts from collections for the services operated by the DAE were insufficient to cover all the costs of operating, managing and maintaining the systems, with the result that subsidies had to be provided by the State of São Paulo. As an illustration, it can be seen that the income of the DAE in 1966 covered only 78% of those current expenses. In 1967, however, administrative improvements and the introduction of a better collection system provided the DAE with the funds needed to cover these expenses and, in addition, a small cash surplus, which obviated the needs of a State subsidy in that year.
- 3.50 Among the major causes of the chronic deficit situation described in the foregoing paragraph, the following may be mentioned:
- Administrative shortcomings.
 - An inadequate rate structure.
 - Shortcomings in the billing and collection system.
- 3.51 Moreover, the application of Law No. 9,580 of December 30, 1966, which pegged the water rates to the current minimum wage 1/, could not work well because wage adjustments are generally not made at precisely the time when the rates need to be increased.
- 3.52 The present document describes a series of measures that have been proposed to help solve the most acute problems confronted in the operation and administration of the potable water systems of Greater São Paulo, notably:
- a. The hiring of consultants with resources from the loans and the local contribution to:
 - i) assist in the organization of COMASP and in the reorganization of the DAE;

1/ Translation of Article 4: Beginning on January 1, 1967, the Departamento de Aguas e Esgotos shall set the unit value of the rate for water consumption which, however, shall not exceed, in cruzeiros per cubic meter, the following fractions of the current monthly minimum wage in the capital:

- a. For the consumption of up to 15 m³/month 0.001.
- b. For the consumption of more than 15 m³/month 0.0015

- ii) carry out a cadastral survey in the city of São Paulo and in the municipalities served by the DAE to determine the number and types of the water users;
 - iii) determine the water losses of the system, now estimated at about 20%;
 - iv) review the present rate structure and propose changes to make the systems profitable.
- b. The proposed resolutions contain appropriate provisions relating to the establishment of prices for the sale of water such as to permit compliance with the conditions imposed by the Bank for potable water projects which it helps to finance.
- c. Moreover, to obviate any difficulty in setting those prices, a letter of intention (see Appendix E) is being obtained from the Government of the State of São Paulo establishing that, if the rate study to be performed (see paragraph 3.38 (ii)) shows that the current State legislation needs to be amended, that government would undertake to present the appropriate bills of law to the Legislative Branch.

Inspection and Supervision

- 3.53 It has been noted in earlier paragraphs that special attention will be given to supervision of the execution of the project works for which COMASP is responsible and that, to this end, a firm of specialized consultants would be hired which, although it would coordinate the work of the other consulting firms in charge of the engineering for the project, would be chiefly responsible for the supervision.
- 3.54 The terms of reference of the work assigned to the consultants mentioned in the foregoing paragraph and the hiring procedures would be approved by the Bank. In this way, it is expected to provide adequate review and supervision to assure that the work will be executed properly, on schedule and at reasonable cost.
- 3.55 Following the foregoing system, and in accordance with the Technical Report, the inspection and supervision for the IDB could be exercised by a technical-administrative team consisting of two specialists: one engineer specializing in major hydraulic works and an expert in administrative accounting and financial matters. They would both follow the execution of the project from beginning to end. Their specific tasks are described in Appendixes 4 and 5 of the Technical-Financial Report.
- 3.56 The cost of the services of the specialists mentioned in paragraph 3.55 would come, according to the budgets computed for the purpose, to about US\$300,000, a figure which has been included in the tables for the cost and financing of the project.

Accounting and Auditing

- 3.57 For proper control of the operations relating to the loan, COMASP would keep adequate independent accounting records showing the application and use of the resources of the loans and of the local contribution. The financial statements of COMASP are to be certified by independent accounting firms acceptable to the Bank, and their fees and expenses are to be borne by COMASP.

IV. JUSTIFICATION OF THE PROJECT

Technical and Financial Feasibility

4.01 As stated in the Technical-Financial Report (Annex I):

- i. The general plan for the works included in the project has been clearly and logically conceived to encompass and help solve the short-run problem of supplying potable water to Greater São Paulo, and was formulated in accordance with modern sanitary engineering techniques.
- ii. Of all the various possible solutions or technical alternatives, it is deduced that the works of the project constitute the "package" best suited to increase and improve, in a short time, the supply of water to Greater São Paulo.
- iii. No impediments are anticipated to the acquisition of construction materials or to the availability of local equipment, nor to the importation of machinery or instruments of foreign origin. Nor is there at present any lack of labor in the zone. All of which will allow the execution of the project within the established term.
- iv. The computed costs are regarded as reasonable in the light of experience with other sanitary engineering projects in Brazil and, moreover, it is believed that eventual cost or price differences could be covered by the contingency allowances that have been computed into the different items (10%).

4.02 The final designs or working drawings for the project have not yet been entirely finished for all the works, but the necessary steps are being taken to assure that they will be completed in accordance with the timetable for execution of the works. Assistance in this would be provided by the consultants to be hired to complement the existing technical capability.

4.03 The financing plan of the project provides US\$1.15 million in foreign exchange and the equivalent of US\$1.85 million in local currency for the hiring of engineering services mentioned in paragraph 3.33, both abroad and in Brazil. The financing plan also provides the equivalent of US\$1 million for the hiring of independent consultants to supervise the execution of the project for account of COMASP (see par. 3.35). This would guarantee not only that the plans and designs would be formulated in accordance with applicable engineering standards, but also that the various works of the project would be properly executed.

4.04 The studies performed in 1964 by the Comissão Especial do Planejamento de Abastecimento de Água da Cidade de São Paulo establish that the Juquerí system is the best short-run alternative because it offers the following advantages:

- i. Relatively short transmission distance;

- ii. A cost per m³ appreciably lower than for the other 10 water sources surveyed;
 - iii. Relatively short execution period;
 - iv. A constant and almost guaranteed flow of water owing to regular rainfall;
 - v. An excellent chemical composition of the water, better than in that of the present system;
 - vi. The possibility of increasing the present supply 70%;
 - vii. The project could be executed in independent and sequenced stages.
- 4.05 COMASP would require a specialized technical-administrative organization to administer the execution of the project. The transfer from the DAE to COMASP of the technical-administrative team, which has been associated with the Juquerí works since their initiation, as noted in paragraphs 2.24-5, would assure that no major difficulties would be encountered in the administration and execution of the project.
- 4.06 According to the proposed resolutions, the prices that COMASP would charge in the sale of water to distributing agencies would make the project self-financing.
- 4.07 In regard to the financial aspects, the following statements may be made:
- i. The contributions of the State of São Paulo would endow COMASP with enough resources, and at the time when they were needed, to fulfill properly its commitments to the local contribution for the project.
 - ii. The presented cash flow shows that the interest and commitment fee proposed are adequate and feasible for the present project throughout the amortization term.
 - iii. The financial situation of the State of São Paulo would allow it to make the contributions to which it would be committed for the counterpart financing of the project; however, since the works of the project would take 3-1/2 years to execute and put into operation, and would yield no income during that period, it is regarded as essential that a grace period of 3-1/2 years be granted for payment of the first installments in amortization of the loan from the ordinary capital resources of the Bank. 1/

1/ A period of 10 years has been agreed on for the Swedish funds, pursuant to the terms of the agreement between the Bank and the Government of Sweden.

Economic Evaluation

- 4.08 The present deteriorated state of the São Paulo water supply system makes it indispensable that it be improved and expanded if it is to supply the potable water requirements of the most densely populated urban area in Brazil.
- 4.09 As explained in the Economic Report, the project constitutes the best and most advisable economic solution of all the various alternatives to provide, in a short period, an adequate supply of potable water to Greater São Paulo, in view of the degree of preparation of the projects.
- 4.10 When the works of the project have been completed, the use of two current small sources ($0.7 \text{ m}^3/\text{second}$), which are in poor condition and are costly to operate, can be discontinued. This, and the resultant economy of scale, would reduce the average cost per cubic meter of water supplied.
- 4.11 Since the city of São Paulo is the largest and most active industrial and economic area of the country, it is regarded as reasonable that a substantial portion of the water to be supplied by the project (23%) be allocated to fill the requirements of its industry, which now supplies itself at high cost. This would help stimulate industrial expansion because of the following advantages:
- A greater, and possibly cheaper, supply of water would be provided for this purpose.
 - Opportunities for new industry, which is now limited by the scarcity and cost of treated water.
 - An improvement in the quality of the water supplied.
 - An 86% increase in the supply of water for industrial purposes.
- 4.12 Moreover, in addition to the economic benefits mentioned, which would justify the use of resources from the ordinary capital resources of the Bank, the additional water that would be made available by execution of the project ($6.0 \text{ m}^3/\text{second}$) would solve the problem of supplying water to low-income groups, a circumstance which gives the project a substantial social component. Hence the proposal to use up to US\$5 million from the resources of the Government of Sweden administered by the Bank, which would be provided on very soft terms.
- 4.13 The solution conceived is regarded as administratively sound, as, on the one hand, it makes use of the specialized capability of the existing agency by putting it in charge solely of the distribution of water to users, and, on the other hand, creates COMASP and organizes it, with the help of specialized consultants, to confine itself to the collection, transmission and treatment of water.

V. CONCLUSIONS AND RECOMMENDATIONS

- 5.01 The project submitted to the Bank for the expansion of the potable water supply system of Greater São Paulo is considered feasible from the technical, economic, financial and legal points of view. It is accordingly recommended that two loans be granted to the State of São Paulo: one for up to the equivalent of US\$11,500,000 from the ordinary capital resources of the Bank, and the other for up to US\$5,000,000 from the resources of the Swedish Development Fund for Latin America, both subject to the provisions set forth in the respective proposed resolutions and to the following conditions to be included in the loan contracts and carried out to the satisfaction of the Bank:
1. Prior to the first disbursement (with the exception of disbursements for technical assistance and for inspection and supervision expenditures) the borrower shall:
 - (a) Present proof to the Bank that DAE has agreed to submit to the Bank its annual financial statements certified by an independent auditing firm acceptable to the Bank whose fees and expenses shall be for the account of DAE.
 - (b) Submit evidence to the Bank, within a period of 6 months from the signature of the contracts, that consultants have been hired, with resources from the local contribution, to perform a cadastral survey in the municipality of São Paulo and in the municipalities currently served by DAE, for the purpose of determining the number and types of water users and compiling the necessary information for establishing an appropriate rate structure and improving the systems of billing and collection, as well as to review the rate structure of the distribution systems and propose such modifications as may be required in order to assure that these water systems will be economically viable in accordance with the corresponding provisions of the loan contracts.
 - (c) Shall take such steps as the Bank deems necessary to ensure that COMASP shall:
 - (i) Hire, within 60 days from the date of the contracts, consulting services for the engineering of the project and the supervision of its execution, after approval by the Bank of the procedures to be utilized in the selection of the consultants, of the list of consultants from which offers will be requested, of the terms of reference for the services to be performed and of the proposed contracts to be signed with said consultants.
 - (ii) Maintain separate and adequate accounting records showing the utilization of the local contributions and the resources of the loans from the Bank in the execution of the project.

- (iii) Submit its annual financial statements certified by an independent firm of public auditors acceptable to the Bank, whose fees and expenses shall be paid by it.
 - (iv) Enter into distribution agreements previously approved by the Bank with the organizations that are to distribute the water to the users, at least six months before the completion of the project.
 - (v) Present to the Bank, within one year from the date of the contracts, a detailed inventory of the property that DAE has transferred or will transfer to COMASP to constitute its capital, with a clear indication as to which items have been transferred.
2. The borrower shall present to the Bank, within a period of one year from the date of the contracts:
- (a) A program for the improvement and expansion of the water distribution system of the Greater São Paulo area, including replacement of meters in poor condition and the installation of additional meters, such program to be accompanied by the respective financial and implementation plans and by assurances that sufficient financial resources to cover its cost will be provided in due time, and
 - (b) A program for the expansion of the sewerage system of Greater São Paulo, covering at least the requirements of that part of the population that is to be benefited by the present project, accompanied by its financial plan.
3. The expenditures for the execution of the project made in the period between September 15, 1967 and the date of the contracts may be considered as part of the local contribution to the project, provided that they do not exceed the equivalent of US\$ 3,300,000.
4. Up to the equivalent of US\$500,000 from the resources of the two loans shall be allocated to the hiring, in accordance with the Technical Assistance Plan of Operations appearing as Appendix B of this document, of the services of:
- (a) specialized consultants to advise COMASP and DAE in matters relating to their organization and administration, and
 - (b) specialized consultants to perform a study aimed at determining the losses of water and differences in pressure in the distribution systems and obtaining the information required in order to prepare the programs for the expansion of those systems, giving special priority to the northern part of the Municipality of São Paulo.

5. The Bank, the borrower, COMASP and DAE shall sign the agreement relating to the technical assistance mentioned in paragraph 4 simultaneously with the loan contracts, or not later than 3 months after the date of said contracts.
6. US\$210,000 of the loan chargeable to the ordinary capital resources of the Bank and US\$90,000 of the loan chargeable to the resources of the Swedish Fund shall be allocated to costs of inspection and supervision by the Bank.
7. An annex substantially similar in content to Appendix A of this document shall be appended to the loan contract.

DESCRIPCION DEL PROYECTO

El proyecto comprende básicamente las obras de captación y aducción para una capacidad no menor de 10 m³/segundo de agua proveniente de los ríos Atibainha y Juquerí. Incluye, además las plantas de bombeo y de tratamiento, los equipos e instrumentos de control para el conjunto de las instalaciones del sistema, y las subaductoras que se requieren para conducir la mencionada cantidad de agua hasta las redes de distribución que alimentan el área metropolitana.

En mayor detalle el proyecto comprende:

1. Tareas Preliminares 1/

- a) Adquisición, limpieza y preparación de terrenos
- b) Caminos de acceso
- c) Movimiento de tierras y excavaciones para túneles y canales
- d) Servicios de ingeniería
- e) Investigaciones del subsuelo y estudios topográficos

2. Equipos de Construcción

- a) Equipos para movimiento de tierras
- b) Equipo automotriz
- c) Equipo de perforación y compresoras
- d) Grúas móviles
- e) Locomotoras Diesel con carreterillas para excavación en túneles
- f) Plantas para preparación y mezcla de concreto
- g) Equipo para colocación y manejo de concreto
- h) Equipos para bombeo
- i) Equipo misceláneo y repuestos

3. Obras Civiles 2/

- a) Represa sobre el Río Atibainha (750 mts. de longitud, y altura de 55 mts.) con descarga constituida por un canal y túnel de 4,5 mts. de diámetro y 5,4 kms. de extensión.

1/ Ya efectuadas y susceptibles de ser reconocidas como parte del aporte local.

2/ Las dimensiones que se indican para especificar las diferentes obras son aproximadas.

- b) Represa sobre el Rio Juquerí (200 mts. de longitud, y altura de 23 mts.) con descarga constituida por un canal de aducción de 930 mts. de extensión y un túnel de 4,5 mts. de diámetro y de 1,600 mts, de extensión.
 - c) Estación de bombeo para elevar el agua 125 mts. hasta un canal cubierto de 980 mts. de extensión, conectada con un túnel de 4,5 mts. de diámetro y de 840 mts. de largo.
 - d) Represa menor (110 mts. de longitud y altura de 17 mts.), con descarga constituida por un túnel de 4,5 mts. de diámetro y de 4,040 mts. de extensión.
 - e) Dos subaductoras (de 2,3 a 0,7 mts. de diámetro) que se conectan con las instalaciones principales de almacenamiento y con las líneas troncales de los sistemas de distribución.
 - f) Equipo de control telemétrico, medidores, válvulas y esclusas.
4. Planta de Bombeo:
- a) Dos bombas, cada una con capacidad de 11 m³/segundo.
 - b) Equipo electro-mecánico, línea de transmisión de alta tensión y subestación.
5. Planta de Tratamiento
- a) Equipos de filtración y tratamiento químico del agua, con capacidad inicial de 11 m³/segundo.
 - b) Edificios.
 - c) Talleres.
 - d) Laboratorios.
 - e) Instalaciones de almacenamiento para agua tratada.
 - f) Filtros.
 - g) Mezcladores.
 - h) Floculadores.
 - i) Sedimentadores.
 - j) Sistemas de control y de medición.
6. Ingeniería, Supervisión y Administración;
- a) Contratación de consultores para:

- Elaboración de planos y diseños de las obras.
- Cálculo de obras y presupuestos.
- Formulación de especificaciones.
- Preparación de documentos para licitación.
- Estudios y adjudicaciones de contratos de obras y de adquisición de equipos.
- Control de la adquisición y verificación de la calidad de los materiales de equipos.
- Informes de progreso de las obras.

b) Supervisión y control global del proyecto por cuenta de COMASP.

c) Administración de las obras.

7. Estudios Complementarios:

Contratación de consultores para:

- a) Encuesta catastral del Gran São Paulo para recoger información sobre los usuarios de agua.
- b) Revisión de la actual estructura de tarifas para la venta de agua a los usuarios.
- c) Preparación de un programa para mejoramiento y ampliación de la red de distribución en las zonas beneficiadas con el proyecto incluyendo planes para la reparación e instalación de medidores.

8. Asistencia Técnica

Contratación de consultores para:

- a) Asesoramiento para la organización administrativa, operacional y contable de COMASP, incluyendo capacitación de su personal.
- b) Asesoramiento para la reorganización administrativa y contable de DAE, incluyendo capacitación de su personal.
- c) Investigación y análisis de las actuales deficiencias de la red de distribución, y formulación de recomendaciones para su mejoramiento.

9. Inspección y Vigilancia

Gastos de inspección y vigilancia del BID: un ingeniero especializado en obras civiles hidráulicas mayores, y un experto en aspectos administrativos-contables-financieros, durante la ejecución del proyecto.

10. Intereses del Préstamo BID:

Servicio de intereses en divisas, durante el período de la construcción.

ASISTENCIA TECNICA REEMBOLSABLE COMO PARTE DEL PRESTAMO AL ESTADO DE
SÃO PAULO
PARA EL PROYECTO DE ABASTECIMIENTO DE AGUA POTABLE
PLAN DE OPERACIONES

I ANTECEDENTES

A) Reorganización de DAE y organización de COMASP

El Gobierno del Estado ha modificado sustancialmente la estructura que sirvió para la administración, el manejo y la atención de los problemas de agua potable del Gran São Paulo, habiéndose creado la nueva institución COMASP, que con la autonomía necesaria se hará cargo de la captación, aducción y venta del agua potable a DAE y a los municipios que tienen a su cargo la distribución del agua a los usuarios.

Una de las razones que motivaron la decisión de distribuir la operación del sistema entre DAE y COMASP es el hecho de que la estructura administrativa y contable de DAE no respondería a las necesidades totales del mismo.

Por otra parte, se ha considerado oportuno que durante el período inicial en el cual COMASP solamente asumiría la responsabilidad de la construcción de las obras del proyecto, se proceda al estudio de la organización interna que en definitiva adoptará esta nueva institución, para hacerse cargo de las funciones que le asigna la ley de su creación.

Las previsiones que se tomen, tanto para la reorganización de DAE como para la organización definitiva de COMASP, jugarán papel de especial importancia en los acuerdos que deberán suscribirse entre el Estado, representado por la Secretaría de Obras y Servicios Públicos, COMASP, DAE y los municipios, para la operación conjunta de captación, aducción, tratamiento y distribución del agua.

Los programas de organización y reorganización mencionados requerirán necesariamente del concurso de especialistas en materias administrativas, manejo de sistemas de agua potable y otras disciplinas propias de esta actividad, para asegurar los mejores resultados y para alcanzar los propósitos y objetivos de tales programas.

Se considera importante complementar la labor de organización con el entrenamiento del personal adecuado que tendría, posteriormente, a su cargo la administración de dichas entidades.

B) Deficiencias en el sistema de distribución

Ha constituido una preocupación constante de las autoridades del Estado de São Paulo y principalmente de DAE, el mejorar las actuales instalaciones que se utilizan para la distribución y suministro de agua potable en Gran São Paulo.

Las observaciones realizadas llevan a la conclusión de que el mencionado sistema registra fallas y deficiencias que atentan contra una explotación racional del mismo y que se viene agravando, especialmente en los últimos años, debido al crecimiento explosivo de la población urbana.

Las soluciones parciales que se han adoptado para resolver los problemas que se presentan a diario, son improvisadas, empíricas y de ninguna manera han podido atenuar la creciente disminución de eficiencia del sistema, que además confronta nuevas dificultades provocadas por el desgaste normal de las cañerías y sus accesorios.

Por lo anterior, se considera indispensable efectuar una investigación integral y detallada que, utilizando las técnicas más modernas de la ingeniería sanitaria, identifique las fallas técnicas del sistema de distribución y permita determinar, en consecuencia, las medidas de corto plazo para mejorar las condiciones actuales y que, además, suministre la información adecuada para programar la futura expansión del mencionado sistema.

También para esta materia se requerirá el concurso de un especialista que coopere con el Departamento Técnico de DAE en la realización de las mencionadas tareas de investigación y de programación de las mejoras que fueran necesarias.

II OBJETIVOS DE LA ASISTENCIA TECNICA

La asistencia técnica que se contempla en este documento persigue los siguientes objetivos principales:

- a) lograr una adecuada organización administrativa, operacional y contable de CCMASP.

- b) mejorar la actual organización administrativa y contable de DAE.
- c) identificar y cuantificar las pérdidas y las deficiencias que se observan en los sistemas de distribución de agua con el objeto de formular recomendaciones que sirvan de base para la preparación de un adecuado programa de mejoras, ampliaciones y modernización de los mencionados sistemas, incluyendo aparatos de medición y control.

III DESCRIPCION DE LA ASISTENCIA TECNICA

La asistencia técnica que formaría parte del préstamo y que sería de carácter reembolsable, se prestaría durante el período de ejecución de las obras en la siguiente forma:

A. Para la organización definitiva de COMASP y para la reorganización de DAE, mediante:

- i) la contratación de consultores especializados en materias administrativas y de organización que tendrían básicamente a su cargo las siguientes tareas:
 - asesorar a COMASP y a DAE en la elección y adopción de sus respectivas estructuras internas y de sus métodos administrativos;
 - establecer criterios para determinar la composición del personal calificado y para su correspondiente selección;
 - cooperar en el establecimiento de adecuados sistemas de auditoría, contabilidad, costos, facturación y cobranzas;
 - elaborar manuales operativos especialmente sobre: personal, compras de materiales y equipos, finanzas, contabilidad, organización y métodos, operación y mantenimiento, planeación, estadísticas, relaciones públicas y compilación de aspectos legales relativos a DAE y COMASP.

La duración del trabajo de estos consultores, en conjunto, se estima en 3-1/2 años. El período de trabajo de cada consultor se determinará de común acuerdo entre el prestatario y el Banco, antes de la contratación del consultor.

- ii) la contratación de profesores (extranjeros y nacionales) para dictar varios cursos de corta duración durante el período de ejecución del proyecto, entre otros sobre materias de: contabilidad y finanzas, auditoría, personal, operación y mantenimiento, organización y métodos y planeación.
- iii) la concesión de aproximadamente 20 becas de corta duración (seis semanas) para que funcionarios de nivel superior pertenecientes a COMASP y a DAE asistan a cursos en el exterior sobre materias técnicas financieras administrativas de nivel medio y/o avanzado, relacionadas con la administración y manejo de empresas de agua potable.

B. Para el estudio de los sistemas de distribución, mediante la contratación en el exterior de un experto en investigación y análisis de deficiencias y pérdidas en sistemas de distribución de agua potable. Dicho experto tendría a su cargo la formación y conducción de un grupo técnico que, bajo su jefatura, contaría con un ingeniero jefe, dos ingenieros auxiliares, dos dibujantes y personal complementario, todos ellos de DAE o contratados al efecto.

Los resultados que se obtengan del trabajo del experto y del grupo bajo su dirección, servirían, en primer término, para formular un programa de aplicación inmediata tendiente a resolver los problemas identificados, y, en segundo lugar, para proyectar las ampliaciones y mejoras futuras del sistema. La duración del trabajo del experto y del grupo técnico mencionado se estima en aproximadamente 3 años.

IV FORMAS DE CONTRATACION DE LOS CONSULTORES

Los consultores que se seleccionen, constituirían grupos de profesionales cuya composición se sometería a COMASP y a DAE para que, previo análisis y juicio de los nombres, curricula vitae y de la labor que desempeñarían cada uno de ellos, procedan a dar su aprobación y a autorizar su contratación.

COMASP y DAE procederían a contratar directamente los servicios de los consultores señalados arriba, previa aprobación del BID de:

- i) los procedimientos utilizados en la selección de los consultores;
- ii) la relación de los consultores a los cuales se proyecte solicitar ofertas de servicios;

- iii) los términos de referencia de los trabajos a realizarse; y
- iv) los contratos que se propongan firmar con los mencionados consultores.

V APLICACION DE LAS RECOMENDACIONES

El deudor se obligará a dar cuenta al Banco, mensualmente, del trabajo de los consultores y COMASP y DAE se obligarán a poner en ejecución las recomendaciones de los consultores o a presentar soluciones alternativas aceptables al Banco, debiéndose corregir, de todas maneras, las deficiencias apuntadas en un plazo no mayor de seis meses de recibida la respectiva recomendación.

COMASP se comprometerá, además, a poner en ejecución, por lo menos seis meses antes de hacerse cargo de la operación de los sistemas existentes que le competen por ley, las recomendaciones de los consultores contratados para asesorar en su organización administrativa, operacional y contable, o presentar soluciones alternativas aceptables al Banco.

VI JUSTIFICACION

La garantía para el eficiente funcionamiento de COMASP y DAE radica fundamentalmente en lograr para ambas instituciones una adecuada organización, objetivo que puede alcanzarse más fácil y rápidamente con el concurso de asesores especializados en la materia.

En cuanto se refiere al sistema de distribución a cargo de DAE, no resultaría aconsejable dotar de mayor cantidad de agua al sistema de distribución sin antes haber resuelto las deficiencias y pérdidas que se registran actualmente.

VII COSTO Y FINANCIAMIENTO DE LA ASISTENCIA TECNICA

El costo de esta asistencia técnica y su plan de financiamiento se detallan en la siguiente manera:

A. Organización Definitiva de COMASP y Reorganización de DAE
(3-1/2 años de duración)

(en US\$ 1.000 o su equivalente)

<u>Rubros</u>	<u>Préstamos BID (Divisas)</u>	<u>Aporte Local</u>	<u>Total</u>	<u>%</u>
Consultores	175 <u>1/</u>	75 <u>2/</u>	250	43,9
Profesores	75 <u>3/</u>	120 <u>4/</u>	195	34,2
Viajes-Consultores y Profesores (10 viajes ida y vuelta US\$1.000 c/u)	10	-	10	1,8
Cursos en el Exterior (20 becas x US\$1.200 c/u)	24	-	24	4,2
Viajes-Becarios (20 x US\$800 c/u)	16	-	16	2,8
Gastos Administrativos (en relación con la Asistencia Técnica)	-	75	75	13,1
T O T A L	300	270	570	100
%	52,6	47,4		

B. Estudio de la Red de Distribución (3 años de duración)

(en US\$ 1.000 o su equivalente)

<u>Rubros</u>	<u>Préstamos BID (Divisas)</u>	<u>Aporte Local</u>	<u>Total</u>	<u>%</u>
Especialista (extranjero)	175 <u>5/</u>	-	175	50,1
Viaje y traslado familia, Especialista	5	-	5	1,3
Equipos y aparatos de medición especializados	20	-	20	5,7
Gastos Administrativos	-	150	150	42,9
T O T A L	200	150	350	100
%	57,1	42,9	100	

1/ 7 consultores - año (US\$ 25.000 c/u)

2/ 5 consultores - año (US\$ 15.000 equivalentes, c/u)

3/ 3 profesores - año (US\$ 25.000 c/u)

4/ 8 profesores - año (US\$ 15.000 equivalentes, c/u)

5/ equivalente a 3 consultores-año (costo calculado con base en consultas preliminares con expertos en la materia).

APENDICE B

Pag. 7

C. Resumen de Costos (A y B)

(en US\$ 1.000 o su equivalente)

<u>Rubros</u>	<u>Préstamos BID (Divisas)</u>	<u>Aporte Local</u>	<u>Total</u>	<u>%</u>
Consultores y Profesores (extranjeros)	425	-	425	46,2
Viajes	31	-	31	3,4
Cursos en el extranjero	24	-	24	2,6
Equipos	20	-	20	2,1
Gastos Administrativos	-	420	420	45,7
T O T A L	500	420	920	100
%	54,3	45,7	100	

VIII SUPERVISION

En los contratos que se suscriban con los consultores se establecerá que la supervisión de la labor que ellos realicen, la podrá ejercer el Banco por intermedio de su Representante en el país.

IX CONTRATACION DE CONSULTORES

El deudor, COMASP y DAF, dentro de un plazo de 90 días de la fecha de los contratos, deberán contratar los servicios de consultoría relativos a esta asistencia técnica.

X RESPONSABILIDAD EN EL BANCO

La División de Préstamos, Zona Sur, tendrá la responsabilidad básica de esta operación hasta la firma del convenio. Terminada esta formalidad, la responsabilidad básica estará en la División de Administración de Préstamos "C". La responsabilidad técnica estará a cargo de la División de Análisis de Proyectos.

LEI No. 10.058, DE 7 DE FEVEREIRO DE 1968

Autoriza o Poder Executivo, a organizar uma sociedade por ações, sob a denominação de Companhia Metropolitana de Agua de São Paulo (COMASP), e dá outras providências.

O GOVERNADOR DO ESTADO DE SAO PAULO:

Faço saber que a Assembléia Legislativa decreta e eu promulgo a seguinte lei:

Artigo 1.o - Fica o Poder Executivo autorizado a constituir uma sociedade por ações, sob a denominação de Companhia Metropolitana de Agua de São Paulo (COMASP), com o objetivo de produzir água potável destinada ao suprimento público das cidades incluídas na área da "Grande São Paulo".

Artigo 2.o - Para o exercício da atribuição prevista no artigo 1.o, compete à COMASP projetar, construir, operar, manter e explorar os sistemas de captação, adução, tratamento e condução de água, para venda, em atacado, às entidades permissionárias da exploração dos sistemas distribuídos dos diversos municípios.

Parágrafo único - No projeto, construção e operação do sistema de reservatórios de sua responsabilidade, a COMASP deverá prever os demais usos de água, observados os dispositivos legais que regulam a matéria.

Artigo 3.o - O capital social inicial da companhia a que se refere esta lei será de NCr\$ 100.000.000,00 (cem milhões de cruzeiros novos) dividido em ações de valor nominal de NCr\$ 10,00 (dez cruzeiros novos), cada uma.

Artigo 4.o - O Govêrno do Estado, através do Departamento de Aguas e Energia Elétrica ou do Departamento de Aguas e Esgotos, deverá ser sempre detentor da maioria das ações com direito a voto.

Artigo 5.o - A subscrição, por parte do Estado, do capital referido no artigo 3.o será realizada:

- I - pelo Departamento de Aguas e Energia Elétrica, em dinheiro;
- II - pelo Departamento de Aguas e Esgotos, através da cessão e transferência, à sociedade a se organizar, do seguinte:
 - a) propriedade dos estudos relativos ao aproveitamento dos rios Juqueri, Capivari-Monos e afluentes;
 - b) os bens desapropriados para êsse fim;
 - c) as obras e equipamentos já existentes e necessários aos objetivos da empresa.

Parágrafo único - Os valores compreendidos no item II dêste artigo serão apurados na forma prevista no Decreto-lei federal no 2.627, de 26 de outubro de 1940.

Artigo 6.o - Fica o Departamento de Aguas e Esgotos autorizado a transferir à COMASP os contratos já firmados e relacionados com o disposto no item II do artigo 5.o.

Artigo 7.o - Os mananciais e as instalações de captação, adução, tratamento, reservação e condução de águas, pertencentes ao Departamento de Aguas e Esgotos, e não totalmente compreendidos entre os bens previstos no item II do artigo 5.o, serão gradativamente transferidos ao patrimônio da COMASP mediante incorporação acionária.

Parágrafo único - Os bens patrimoniais de outros sistemas existentes, ou em execução, inclusive os de propriedade do Departamento de Aguas e Energia Elétrica, poderão ser incorporados ao patrimônio da COMASP na medida do interesse da expansão dos serviços que lhe são afetos, observado o disposto no parágrafo único do artigo 5.o.

Artigo 8.o - Os estudos, projetos, instalações e obras para aproveitamento dos rios Juqueri, Capivari-Monos e afluentes ficarão imediatamente sob a guarda, administração e responsabilidade da COMASP, até que se efetive sua incorporação.

Artigo 9.o - O Governo do Estado poderá transferir parte de suas ações a municípios, desde que mantenha a maioria prevista no artigo 4.o.

Artigo 10. - A distribuição das quotas de eventual participação de municípios no capital social da empresa e as de utilização de serviços será disciplinada nos estatutos da sociedade.

Artigo 11. - Fica o Departamento de Aguas e Esgotos autorizado a transferir ao Departamento de Aguas e Energia Elétrica a propriedade de suas ações na COMASP.

Artigo 12. - O Poder Executivo, através das entidades mencionadas no artigo 4.o, fica autorizado a subscrever, em dinheiro e mediante conferência de bens, até 31 de dezembro de 1970, além subscrição autorizada pelo artigo 5.o desta lei, mais o montante de NCr\$ 200.000.000,00 (duzentos milhões de cruzeiros novos) em ações da COMASP.

Parágrafo único - Para atender às despesas com a subscrição, em dinheiro, das ações de que trata este artigo, o Poder Executivo fará constar dos orçamentos do Departamento de Aguas e Energia Elétrica, referentes aos exercícios de 1969 e 1970, as respectivas dotações.

Artigo 13. - Para atender às despesas a que se refere o item I do artigo 5.o no corrente exercício, fica o Poder Executivo autorizado a abrir, na Secretaria da Fazenda, ao Departamento de Aguas e Energia Elétrica, créditos especiais até a importância de NCr\$ 90.000.000,00 (noventa milhões de cruzeiros novos).

Parágrafo único - O valor dos créditos de que trata este artigo será coberto com os recursos provenientes do produto de operações de crédito que a Secretaria da Fazenda fica autorizada a realizar, na forma de legislação vigente, e de anulação de dotações orçamentárias referentes à "Ampliação de Serviços Públicos" e a "Serviços em Regime de Programação Especial".

Artigo 14. - Os atos, contratos e outros papéis da sociedade mencionada nesta lei, durante o prazo de sua duração, ficam isentos de impostos e taxas estaduais de qualquer natureza.

Parágrafo único - Nos processos judiciais em que a sociedade fôr parte ou de qualquer modo interessada, as custas dos serventuários deverão ser contadas sempre com a redução de 50% (cinquenta por cento) sobre o previsto nos regimentos em vigor na data dos atos em prática. De idêntica redução gozará a sociedade nas custas dos serventuários do fôro extrajudicial, de cartórios, de tabeliães, registros civis, de imóveis e de títulos e documentos.

Artigo 15. - Fica o Governo do Estado, através da Fazenda Estadual e do Banco do Estado de São Paulo S/A., autorizado a oferecer fiança ou demais garantias nas operações de crédito que venha a realizar a COMASP, para obtenção de recursos necessários à construção, ampliação e melhoramento dos sistemas sob sua exploração.

Artigo 16 - A partir da data de incorporação dos bens do Departamento de Aguas e Esgotos ao patrimônio da COMASP, ficarão automaticamente extintos, naquela entidade, os serviços cuja natureza e finalidade constituam, na ocasião, os objetivos da Companhia.

Parágrafo único - Obedecido o disposto neste artigo, deverá o Departamento de Aguas e Esgotos submeter à aprovação do Governador projeto de decreto reestruturando a entidade a reenquadrando o seu pessoal, dentro de 90 (noventa) dias a contar da última incorporação.

Artigo 17. - O Governo do Estado poderá colocar à disposição da COMASP servidores da Administração Pública, direta ou indireta, nos termos da legislação vigente.

Artigo 18. - Esta lei entrará em vigor na data de sua publicação.

Artigo 19. - Revogam-se as disposições em contrário.

Palácio dos Bandeirantes, 7 de fevereiro de 1968.

ROBERTO COSTA DE ABREU SODRE

Luis Arrôbas Martins
Eduardo Riomey Yassuda

DR. HAROLDO JEZLER (DIRETOR - PRESIDENTE DA COMASP)

1 - Dados pessoais:

Nascido a 25 de novembro de 1922, em Lençóis Paulista (SP), filho de Dr. Waldemar Jezler e D. Odila O. Jezler, casado com D. Carmen Novoa Jezler, com três filhos.

2 - Documentos de Identidade e Habilitação:

- Gabinete de Identificação, Est.S.Paulo RG 564.876;
- Ministério da Guerra, Carteira 10.402, RG 109.096
- CREA, Carteira No. 6346-D, 6a. Região
- Carteira Profissional Min. do Trabalho No. 75.387, série 100-A

3 - Formação Profissional:

- 1946 - Engenheiro Civil pela Escola Politécnica da USP;
- 1952 - Master of Science in Sanitary Engineering School, of Public Health, Un. of N. Carolina;
- 1953 - Aprovado nos exames orais qualificativos para candidato ao grau de "Doctor of Philosophy" da Un. de Harvard;
- 1954 - Master of Engineering, Graduate School of Arts and Science, Un. de Harvard.

4 - Atividades Profissionais:

- Assistente Contratado da Cadeira de Hidráulica e Saneamento da Escola Politécnica da USP (8-3-47 a 12-9-48 e 22-5-51 a 1-9-62).
- Idem do Depto. de Saneamento da Fac. de Higiene e Saúde Pública da USP (19.5.48 a 29.11.49 e 2.3.54 a 10.9.57)
- Engenheiro do Serviço Especial de Saúde Pública, sediado sucessivamente em Belém do Pará, Território Federal do Guaporé e Manaus no Amazonas (nov. 49 a abril 51)
- Professor assistente na Fac. de Arquitetura Mackenzie (2o. sem 54)
- Sócio e Engenheiro Responsável da firma Mello e Jezler Ltda. Engenharia (1948/49) - São Paulo
- Sócio-Gerente e Engenheiro Responsável da firma Saneamento Ltda. Soc. de Eng. Sanitária e Civil (1957/58) - São Paulo.
- Diretor-Superintendente e Engenheiro Responsável da firma Saneamento S/A - Eng. Sanitária e Civil, sucessora da acima (1958/62) - São Paulo

Engenheiro da Organização Panamericana de Saúde, Organização Mundial de Saúde em Washington, D.C. (1962/66)

Presidente do Conselho Estadual de Águas e Esgotos, empossado em 17-5-67 (em exercício)

Diretor-Técnico da firma Construtora Guarantã S/A, desde agosto 66 até a data.

5 - Trabalhos Realizados:

5.1 - Colaborou, publicando trabalhos, nas revistas seguintes:

- Engenharia, São Paulo
- Arquivos da Faculdade de Higiene e Saúde Pública, S. Paulo
- Ingeniería Sanitaria, México
- Revista do DAE, S. Paulo
- Revista Politécnica, S. Paulo
- Revista Paulista de Hospitais, S. Paulo
- Arquitetura e Engenharia, Belo Horizonte
- Boletim da Oficina Sanitária Panamericana, Washington, D.C. USA

5.2 - Participou e apresentou trabalhos em vários cursos especiais, conferências, seminários e congressos de sua especialidade (Engenharia Sanitária)

5.3 - Autor e responsável por numerosos projetos e obras de abastecimento de água e serviço de esgoto para cidades contratadas com o Departamento de Obras Sanitárias do Estado de São Paulo, Fundação de Serviço Especial de Saúde Pública e outras entidades.

5.4 - Viagens de Estudo e Serviço:

Em função de bolsas de estudos e de atividades profissionais tem viajado com bastante frequência pelo País, conhecendo quasi todos os Estados. Para o exterior viajou com frequência para os Estados Unidos da América do Norte, México, América Central, Caribe, Venezuela, Colombia, Perú, Paraguai, Argentina, Uruguai e Chile.

ATHAIDE ROSA (DIRETOR FINANCEIRO DA COMASP)

1. Nascimento: 27/7/1928.
2. Concluiu o curso de Contador em 1949 na Escola Técnica de Comércio Carlos de Carvalho, nesta Capital.
3. Concluiu o curso de Ciências Econômicas em 1954 na Universidade de São Paulo.
4. Em 1959 fez curso sobre Fundamentos da Técnica Econômica; patrocinado pela USP.
5. Em 1961 fez curso sobre Futura Política Econômica e Financeira do Brasil.
6. Em 1962 fez curso de Pós-Graduação de 1 ano sobre Economia Brasileira.
7. Em 1962 fez curso Internacional de Crédito Agrícola, patrocinado pela Organização dos Estados Americanos, em Campinas.
8. De 1962 a 1963 foi Professor Assistente da Cadeira de Economia Brasileira da Faculdade e Liceu de Ciências Econômicas São Luiz.
9. Em 1967 frequentou o 8o. Ciclo de Estudos da Associação dos Diplomados da Escola Superior de Guerra - ADESG.
10. Atividades:
 - Em 1953 foi Contador do Departamento de Águas e Energia Elétrica.
 - Em 1954 foi Inspetor de Contabilidade do Departamento de Águas e Energia Elétrica.
 - Em 1957 foi Fiscal de Tarifas do Departamento de Águas e Energia Elétrica.
 - Em 1961 foi Chefe do Serviço Administrativo Regional do Serviço do Vale do Paraíba do Departamento de Águas e Energia Elétrica.
 - Em 1962 foi Chefe da Secção de Crédito do Departamento de Águas e Energia Elétrica.
 - Em 1963 foi Chefe da Divisão de Economia e Contrôlê Administrativo do Grupo Executivo do Alto Rio Paraíba.
 - Em 1963 foi Chefe do Contrôlê Financeiro da Ex-COMEPA - Companhia Melhoramentos de Paraibuna.
 - De 1965 a 1966 foi Superintendente Financeiro da Ex-COMEPA - Companhia Melhoramentos de Paraibuna.
 - Em 1967 foi Assistente Executivo do Departamento Financeiro das Centrais Elétricas de São Paulo - CESP.
 - Exerce atualmente a função de Chefe do Departamento de Economia das Centrais Elétricas de São Paulo - CESP.

ENG. DJALMA CAMPOS GUIMARÃES (DIRETOR TECNICO DA COMASP)

Informações Gerais:

Nome: Djalma Campos Guimarães
Filiação: Juvenal de Andrade Guimarães e Carolina de Arruda Campos
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Filhos: Maria Aparecida Rodrigues Guimarães, Maria Lúcia Rodrigues
Guimarães e Djalma Campos Guimarães Filho
Profissão: Engenheiro Civil, registrado no Conselho Regional de Engenharia e Arquitetura 6o. Região sob No. 9127/D

Cursos

Primário: Grupo Escolar de Palmital, Palmital, SP, (1936/1939)
Secundário: 1o. Ciclo - Escola Normal Oficial de Assis, Assis, SP,
(1941/1944)
2o. Ciclo - Colégio Ateneu Paulista, Campinas, SP, (1945/1947)
Militar: Aspirante a Oficial R/2, pelo C.P.O.R. de Curitiba, PR,
(1949/1950)
Superior: Engenharia Civil, pela Escola de Engenharia da Universidade Federal do Paraná, Curitiba, PR, (1948/1952)
Extensão Universitária: "Mecânica dos Solos" (Prof. Samuel Chamecki);
"Grandes Composições em Arquitetura" (Prof. David Azambuja); "Métodos de Cálculo de Estruturas Hiperestáticas" (Prof. Telêmaco Van Langendonck); e
"Materiais de Construção" (Prof. Elato Silva).
Outros Cursos: "Liderança", pelo ISELD; "Métodos de Programação CPM+PERT" pelo IDORT; "Racionalização do Trabalho", pelo IDORT; e "Língua Inglesa", pelo Centro Cultural Interamericano de Curitiba.

Estágios e Viagens ao Exterior

Estágios, em 1957, nas Seções de Solos e de Concreto do Instituto de Pesquisas Tecnológicas de São Paulo.
Viagem de Férias, em 1952, para visita às Escolas de Engenharia do Uruguai, Argentina e Chile.
Viagem de Inspeção às fábricas dos equipamentos hidro-eleto-mecânicos das Usinas Hidroelétricas de Barra Bonita e de Bariri, em 1961, na Checoslováquia, Itália, Suíça e Alemanha Ocidental, e de contatos com a tecnologia de construções hidráulicas na França e Portugal.

Atividades Profissionais

ESSO STANDARD DO BRASIL, em São Paulo, SP, de 1953 a 1957, como Engenheiro Assistente da Seção de Engenharia da Região Sul.

CHERP-COMPANHIA HIDROELETRICA DO RIO PARDO, em São Paulo, SP, de 1957 até a fusão da empresa, em 1966, à CESP-CENTRAIS ELETRICAS DE SÃO PAULO, nas seguintes funções:

1957/1959 - Engenheiro Fiscal Assistente das obras da Usina Hidroelétrica de Barra Bonita.

1959/1963 - Engenheiro Residente das obras da Usina Hidroelétrica de Barra Bonita.

1963/1966 - Chefe do Departamento de Construção.

1965 - Diretor Técnico Substituto, por 2 meses.

1966 - Diretor Técnico Substituto, por 3 meses.

CESP-CENTRAIS ELETRICAS DE SÃO PAULO, São Paulo, SP, nas seguintes funções:

1967 - Chefe do Departamento de Distribuição.

1967 - Chefe da Equipe Executiva do Grupo de Planejamento.

D.A.E. - DEPARTAMENTO DE ÁGUAS E ESGOTOS - A pedido do Senhor Secretário de Estado dos Negócios dos Serviços e Obras Públicas de São Paulo, posto à disposição do Senhor Diretor Geral do D.A.E., para assessoria em obras de produção de água, conforme Offício DD.CESP/1292/04.18.01, de 8 de dezembro de 1967.

1968 - Supervisor da Coordenação Executiva de Obras de Produção de Água, por Ato do Senhor Diretor Geral do D.A.E., em decorrência do disposto na Portaria GDG/3/68.

ABRAHÃO FAINZILBER

Abrahão Fainzilber nasceu em janeiro de 1924 na cidade de Palmares no Estado de Pernambuco.

Diplomou-se em engenharia civil pela Escola Politécnica da Universidade da Bahia em 1954.

Atividades de Magistério:

- Organização Sanitária Panamericana - Cursos de Administração e Tarifas, ministradas no período de 1965-1966
- Escola Politécnica da Universidade de Pernambuco - Curso sobre Planejamento e Administração, ministrado em 1967.
- Centro Regional de Administração Municipal - Cursos sobre Tarifas, ministrados em 1967.

Atividades Públicas:

- Ministério da Fazenda na Bahia no período de 1954-1956
- Secretaria Municipal de Água e Saneamento da Prefeitura Municipal de Porto Alegre - 1957-1959.
- Superintendencia do Desenvolvimento do Nordeste (SUDENE) 1961-1965
- Companhia de Águas e Esgotos do Nordeste (CAENE) Diretor Presidente 1962-1964

Atividades Privadas:

- Guimarães & Pessoa de Queiróz - Construtora - 1950-1951
- Ron Bacardi S.A. - Recife - 1960
- Azevedo, Cunha e Associados - Projetos - 1965
- Abrahão Fainzilber - Consultoria em Engenharia Civil e Sanitária - 1965-1968

Cursos de extensão:

- Introdução ao Planejamento Urbano - Bahia - 1955
- Tratamento de Líquidos Cloacais - Rio Grande do Sul - 1957
- Tratamento de Resíduos Industriais - Rio Grande do Sul - 1958.

É autor de vários trabalhos sobre administração e tarifas, tanto nacionais como internacionais.

É autor ainda de vários estudos e projetos de viabilidade econômica, entre os quais se destacam os das cidades de Aracajú, João Pessoa, Olinda, Patos, Terezina, e Fortaleza, sendo este último realizado em equipe no escritório Azevedo, Cunha e Associados.

Prestou assessoria à Costa Rica e Perú, entidades através da Organização Sanitária Panamericana.

PROF. EDUARDO RIOMEY YASSUDA

O Prof. Eduardo Riomey Yassuda nasceu em outubro de 1924, na cidade de Pindamonhangaba, Estado de São Paulo.

Diplomou-se em engenharia civil pela Escola Politécnica de São Paulo, em 1947. Diplomou-se em engenharia sanitária, no curso de pós-graduação da Faculdade de Higiene e Saúde Pública da Universidade de São Paulo, em 1949. Fez diversas viagens de treinamento e cursos para aperfeiçoamento, compreendendo inclusive sete viagens ao exterior e um curso na Universidade de Minnesota com bolsa de estudos da Organização Mundial da Saúde.

É membro titular do Instituto de Engenharia de São Paulo, onde participou da fundação da Divisão Técnica de Engenharia Sanitária, da qual foi lo. secretário em 1954 e 1967.

É sócio fundador da AIDIS - Associação Interamericana de Engenharia Sanitária, da qual foi Secretário da Sub-Secção Paulista em 1951-1953 e Vice Presidente da Secção Brasileira nos períodos 1955-1957 e 1957-1959. Foi o Secretário Geral do IV Congresso da AIDIS, realizado em São Paulo em 1954.

Foi assistente da cadeira de Saneamento da Faculdade de Higiene e Saúde Pública da Universidade de São Paulo, no período 1949-1950 e professor de disciplina na mesma cadeira, no período 1950-1954. Foi professor contratado da cadeira de Abastecimento de Água e Sistemas de Esgotos, no período de 1954-1961. É professor catedrático desta Cadeira, desde 1961 após ter sido aprovado em concurso público de títulos e provas.

Foi professor regente da cadeira de Saneamento da Escola Politécnica da Universidade de São Paulo, no período de 1962-1965.

Foi engenheiro do Departamento de Obras Sanitárias da Secretaria da Viação e Obras Públicas de Estado de São Paulo, de 1950-1954. Neste período, trabalhou em projetos e em construção de obras sanitárias em todo o Estado e exerceu funções de chefia, inclusive de Diretor de Divisão.

Desligou-se do serviço público e integrou, durante cinco anos (1954-1959), o quadro diretor da firma ECOSA - Empresa de Construções e Saneamento Ltda.

Incumbiu-se de importantes trabalhos de consultoria, fazendo parte de firma Azevedo, Cunha e Associados Ltda.

Em fins de 1963 fundou juntamente com outros engenheiros a empresa PLANIDRO - Consultores de Engenharia Hidráulica e Sanitária Ltda. da qual em 1967 desligou-se em virtude do convite do Governo de São Paulo que o convidou para o cargo de Secretário de Estado dos Negócios dos Serviços e Obras Públicas.

Recebeu vários títulos honoríficos, além de ser autor de cerca de vinte e cinco trabalhos relacionados com a Engenharia Sanitária.

APENDICE E

TEXTO DEL CABLE RECIBIDO DEL GOBIERNO DEL ESTADO DE SÃO PAULO COM
FECHA 1 DE ABRIL DE 1968

" GOVERNO DO ESTADO DE SÃO PAULO DE ACORDO COM COMPROMISSOS QUE ASSUMIRA
CONTRATO DE EMPRESTIMO COM ESSF ESTABELECIMENTO CREDITICIO ET CONSCIO
DA IMPORTANCIA QUE REPRESENTA PARA EFICIENCIA OPERATIVA DA COMASP A
RELACAO ENTRE OS PRECOS DE VENDA DE AGUA DESTA EMPRESA ET AQUELES QUE
VENDERAO AS DISTRIBUIDORAS AO CONSUMO VG DETERMINOU EFETIVACAO DE ES-
TUDOS DO SISTEMA TARIFARIO ATUALMENTE VIGENTE PARA O DAE ET SE CONS-
TATADO MESMO IMPECA CONDICAOES ECONOMICAS RELACOES CUSTO PRODUCAO ET
DISTRIBUICAO PARA RESPECTIVAS VENDAS VG APRESENTARA ESTE EXECUTIVO
PROJETO DE LEI AO PODER LEGISLATIVO PROPONDO ALTERACAO DA ATUAL LEI
9.580 DISPONDO SOBRE NOVO SISTEMA TARIFAS COMASP E DISTRIBUIDORAS NO
SENTIDO DE GARANTIR CONDICAOES DE FUNCIONAMENTO AUTOSUFICIENTE RESPEC-
TIVAS EMPRESAS "

A N N E X I

TECHNICAL AND FINANCIAL REPORT

JUQUERI PROJECT FOR THE ENLARGEMENT

OF THE WATER SUPPLY SYSTEM OF

THE METROPOLITAN REGION OF SAO PAULO

Deputy Management for Project Analysis
Social Projects Division

March 29, 1968

TABLE OF CONTENTS

<u>SECTION</u>	<u>D E S C R I P T I O N</u>	<u>PAGE</u>
I	RESUME, CONCLUSIONS AND RECOMMENDATIONS	1
	1.01 Resumé	1
	1.02 Conclusions	1
	1.03 Recommendations	3
II	TECHNICAL ANALYSIS OF THE EXECUTING AGENCY	8
	2.01 Role of Companhia Metropolitana de Água de São Paulo (COMASP)	8
	2.02 Role of Departamento Nacional de Águas e Esgotos (DAE)	8
	2.03 Production and Distribution by DAE	8
	2.04 Structure of COMASP	8
	2.05 Legal Capacity of COMASP for Setting Rates	8
	2.06 Provision for Rate Adjustments	9
	2.07 Description of Existing Facilities	9
	2.08 Technical Capacity of the Executing Agency	17
	2.09 Operation and Management	18
III	OTHER SIMILAR WORKS IN PROCESS	19
	3.01 Current Status of Other Works Being Executed by the Same Agency not Financed by the Bank	19

TABLE OF CONTENTS (Cont.)

<u>SECTION</u>	<u>D E S C R I P T I O N</u>	<u>PAGE</u>
IV	TECHNICAL ANALYSIS OF THE PROJECT	20
	4.01 Technical Description	20
	4.02 Basis of Need for the Project	25
	4.03 Design Criteria and Current Status of Design	26
	4.04 Review of Cost Estimates	31
	4.05 Alternatives Considered and Costs Thereof	32
	4.06 Methods of Construction	34
	4.07 Analysis of Benefits, Tariffs, Charges or Profitability	34
	4.08 Operation and Maintenance	37
	4.09 Future Expansion	37
	4.10 Special Technical Problems	38
V	PROJECT EXECUTION	40
	5.01 Proposed Construction Schedule	40
	5.02 Proposed Schedule of Investment	40
	5.03 Plans and Procedures Proposed for Securing Contracts for Procurement, Construction, Materials and Supplies	40
	5.04 Technical Assistance	41
	5.05 Parallel Studies by DAE	42
	5.06 Control of Execution by the Executing Agency	42

TABLE OF CONTENTS (Cont.)

<u>SECTION</u>	<u>D E S C R I P T I O N</u>	<u>PAGE</u>
V	5.07 Proposed Inspection and Supervision of Execution by the Bank	44
	5.08 Schedule of Financial Requirements for the Project	45
VI	FINANCIAL ANALYSIS	55
	6.01 Approach of the Study	55
	6.02 Analysis of the Organization	55
	6.03 Financial Analysis	63
	6.04 Financial Analysis of the Project	73

LIST OF FIGURES

<u>FIG. No.</u>	<u>T I T L E</u>	<u>PAGE</u>
1	Juquerí System	10a
2	List of Dams	11
3	DAE Treatment Plants	14
4	Major Reservoirs	15
5	Present Distribution Network	15
6	Present Construction	19
7	Juquerí System, Stage Development	19a
8	Juquerí System, Atibainha-Juquerí Reversals to Treatment Plant and Profile of Main Hydraulic Circuit	20a
9	Outline Data for Pumping Station	21
10	Supply of Water for Greater São Paulo 1966 - 67	25
11	Engineering Program	27
12	Estimate of Domestic Consumption	27
13	Rio Juquerí Water Analysis	28
14	Streamflows of Juquerí System	28
15	Hydraulic Design Data	29
16	Estimated Status of Design	31
17	Project Cost	32
18	Relative Cost of Alternate Sources	33

LIST OF FIGURES (Cont.)

<u>FIG. No.</u>	<u>T I T L E</u>	<u>PAGE</u>
19	Typical Rates	35
20	Juquerí System - Construction Schedule	40a
21	Investment Program	40b
22	Costs and Revenue of Juquerí Project	45a
23	Budget Execution	63
24	Interest and Amortization	64
25	State of São Paulo	64
26	COMASP / Financial Situation to March 11, 1968	65
27	Condensed Balance Sheet	66
28	Analysis of "Receivables"	67
29	Billing and Collecting	68
30	Condensed Income Statements	70
31	Income and Funds Statement	70
32	Sources and Application of Funds	71
33	Financial Ratios	72
34	Necessary Local Contribution	73
35	Local Contribution as in the Plan Plurianual	74
36	Loan Conditions assumed in the Financial Forecast	76

LIST OF APPENDICES

<u>APPENDIX No.</u>	<u>T I T L E</u>	<u>PAGE</u>
1	Comparative Characteristics for Selected Large Pumps	46
2	General List of Goods and Services	47
3	Direct Foreign Costs	48
4	Terms of Reference for Project Specialist (Engineer)	49
5	Terms of Reference for Project Specialist (Financial)	52
6	Estimated Cost of IDB Super- vision and Control	54
7	General Organogram	77
8	COMASP - Organogram	78
9	DAE Organogram	79
10	Condensed Balance Sheet - DAE	80
11	Financial Forecast at Production Level	81
12 A & B	Financial Forecast at Distribution Level	82 & 83

SECTION I - RESUME, CONCLUSIONS AND RECOMMENDATIONS1.01 Resumé

This project is the first stage of a plan to develop an additional source of water for the Metropolitan Area of São Paulo, the largest city in Brazil.

It consists of the construction of a dam on the Atibainha River, 55 meters high and 750 meters long at the crest, forming a reservoir which feeds into the Juquerí River through a tunnel 5.4 kms. in length; a dam on the Juquerí River 25 m. high and 180 m. long at the crest, forming a second reservoir which feeds a pumping station through a canal 3 kms. in length and a tunnel 1.2 kms. in length; a pumping station in the tributary Santa Inez valley which raises the water 125 m. to a concrete box flume 980 m. long. followed by a tunnel 860 m. long that discharges into a small intermediate reservoir; a small dam on the Ribeirão Aguas Claras to create the reservoir which feeds a new filter plant at Guaraú through a tunnel 4.8 kms. in length; a new filter plant at Guaraú; and large supply mains from the treatment plant to key distribution reservoirs in the city.

This stage will provide 10 m³/sec. nearly equivalent to the present deficit. It will cost US\$ 82,000,000, take 4 years to execute, and provide water for 2.5 million people.

To complete the plan, which will produce a total of 22 m³/sec. dams and canals will be built on the Cachoeira and Jaguari Rivers to divert their flows into the Juquerí System. The tunnels, canals, pumphouse and filter plant are designed for this final capacity so that pumps and filters can be added as needed.

1.02 Conclusions

It is concluded that:

- a. The lack of an adequate quantity of water for São Paulo is critical and immediate steps should be taken to increase it.
- b. The project is feasible.
- c. The services of qualified consulting firms and consultants will be needed by the executing agency (Companhia Metropolitana de Aguas, COMASP) for assisting in planning and executing the project.
- d. The rate structure needs to be improved.

- e. The critical elements controlling the time of construction are the specification purchase and installation of pumps, motors, and control equipment.
- f. The new production agency Companhia Metropolitana de Agua de São Paulo (COMASP) needs assistance in organization and the Departamento de Aguas e Esgotos (DAE) needs assistance in administrative reorganization.
- g. The project is of such a magnitude and complexity that the IDB will need to retain the services of highly qualified engineers to carry out the desired control and supervision.
- h. Surveys need to be made to determine the number and class of users and the losses and pressure conditions in the distribution system.
- i. The distribution system needs to be strengthened and extended. Extensions to the distribution system were halted in 1962 because of the lack of water and there are various areas of the city where the system is incomplete.
- j. The condition of the existing water meters is not known and it is considered that a large program for repair and replacement of the defective meters as well as the installation of new ones must be undertaken by DAE.
- k. Final plans and specifications need to be prepared for all parts of the project. Detailed topographic and geological investigations are needed for the adequate design of tunnels, pumping station, treatment plant and dams. The spillway design for the Juquerí Dam should be carefully reviewed.

l. Organization

COMASP has not yet been organized and exists only in law.

The Organogram represents only a general idea without study of its underlying basis. Its analysis results in the necessity of a reexamination.

The plan for the divisions of Finance and Accounts reveals weaknesses which should be corrected.

m. Analysis of Financial Situation

The borrower, the State of São Paulo, shows during the last few years a surplus on current account and a deficit on capital account, with an unfavorable total net balance.

The budget for 1968 envisages another deficit.

DAE, the entity that will take charge of the distribution of the major part of the water produced by the project, shows a moderate degree of indebtedness and negative operational results.

It has not had serious problems of funds as a result of receiving of State subsidies and considering that the depreciation, which is an important part of operating expenditures, does not represent cash disbursements.

The current ratio is not favorable and the collection system is definitely in need of improvement.

n. Financial Projectives

From the information available there is no assurance of the local contribution beyond the first year.

The analysis of the projected results and the projected flow of funds, both for the producing entity as well as for the main distributing entity, reveals no financial difficulties for the period of 10 years of operation.

- o. Four contracts have been let for works forming part of the Juquerí Dam, tunnels and the treatment plant.

1.03 Recommendations

It is recommended that:

Prior to signing of contract:

1. A detailed scheme should be submitted to the satisfaction of the Bank in which the system to be utilized for the relations between the State of São Paulo and COMASP regarding the management of the loan funds, is laid down.
2. The borrower should commit itself to include in its annual budgets, beginning from 1969, the necessary amounts for the local contribution to the project.
3. The borrower should commit itself to appropriate in due course the necessary amounts for DAE to insure that that institution has the necessary resources for its operations and the normal development of the project.

Within 3 months after the signing of the contract:

4. COMASP shall have contracted, to the satisfaction of the Bank, an independent firm for the purpose of setting up its administrative organization and procedures; a general plan of this work shall be submitted for the approval of the Bank within 90 days after the commencement of the work.

COMASP shall undertake to carry out the recommendations of the consultants or will propose to our Bank alternative solutions for its approval.

5. DAE shall undertake, on the same basis as outlined in the preceeding paragraph, the contracting of technical assistance for its organization.

The cost of the services referred to under 4 and 5 above may be charged against the loan up to an amount of US\$ 300,000.

6. The borrower shall hire qualified consulting engineering firms and consultants to assist in executing the program. These firms and consultants will do the programming, make special investigations and studies as required, prepare final plans and specifications, assist in the letting and evaluation of bids, supervise and inspect the construction and assist in placing the system in operation. These services may be paid from the loan funds and up to US\$ 1,650,000 may be used for this purpose.
7. The borrower shall hire an experienced firm to carry out a survey of the distribution system to determine water losses, pressure distribution and provide the necessary information for the overall improvement and strengthening of the distribution system, with first priority to the northern half of the city. This shall be paid from loan funds and up to the equivalent of US\$ 200,000 can be used for this survey.

Within 6 months after the signing of the contract:

8. The borrower shall submit its financial plan ("Plan Pluriannual") (1) which will include the contribution necessary for the completion of the project during the construction.

(1) Comprising several years, and indicating the budget for each specific year.

9. The borrower shall hire qualified consulting firms to make a cadastral survey of the city of São Paulo and the municipalities presently served by DAE within the Metropolitan area of São Paulo, to determine the number and type of water users, and collect information necessary to establish an adequate rate structure and improve billings and collecting. This shall be paid from local funds.
10. The borrower shall retain the services of special consultants in rate studies to review the existing schedules, operating costs, and the information obtained in (9), and to develop for DAE and other communities served, rates that are sufficient to produce revenue to pay the normal costs of operation, maintenance, depreciation, amortization and interests and a reasonable rate of return on the investment.

Alternative 1 of the Bank's standard clauses should be applied and the computation for the determination of the proposed rate schedules should be submitted to the Bank for approval.

These rates will be put into effect as soon as feasible.

This study shall be paid from local funds and up to US\$ 55,000 can be used for this purpose.

Studies in recommendations 9 and 10 could be done by the same firm if qualified.

11. The borrower shall submit to the IDB for approval, the plan for improving and extending the distribution system in the northern half of the city and the program for its financing and execution. This shall be paid from local funds.

Within one year after the signing of the contract:

12. The borrower and DAE should present a technical and financial program for the repair, replacement and installation of water meters in the areas served by the Juquerí System. This should be coordinated with the overall project and paid from local funds.
13. If the rates required in (10) are higher than the maximum permitted under the present laws, the borrower, the State of São Paulo, will take the necessary steps, satisfactory to the Bank, within one year after the signing of the contract, to permit the adjustment of the rates as required.

14. A draft of the agreement to be signed between COMASP and the distributing agents will be submitted for the approval of the Bank. This agreement should cover in particular the basis of the tariffs in compliance with the clause proposed in this recommendation.
15. The borrower shall submit a detailed inventory, satisfactory to IDB, of all items received and to be received by COMASP from DAE.

With respect to General Conditions.

16. IDB shall hire a highly experienced engineer and a fiscal expert with accounting experience to exercise supervision and control of the entire project. These men will review and approve satisfaction of loan contract conditions, general criteria, programming, plans and specifications, letting and award of bids, inspect construction, review and recommend requests for disbursements and maintain the IDB informed on all phases of the project. In addition, funds will be provided for hiring short-term specialists as needed to review the plans, specifications and bidding documents for specific matters, such as the pumps, tunnels and dams.

It is estimated that US\$ 300,000 from the loan funds will be required. These men should be hired as soon as the legal conditions of the loan contract have been fulfilled.

17. COMASP shall keep a separate set of accounts for the program and will submit to our Bank its code of accounts within 90 days after the contracting of the consulting firm referred to under (4) above.
18. The financial statements of COMASP and DAE will be examined and certified by a firm of independent public accountants acceptable to the Bank.
19. COMASP will not distribute cash dividends unless it proves to the satisfaction of the Bank:
 - a. That it counts with sufficient resources to discharge its current obligation maturing within the next 12 months.
 - b. That it counts with sufficient resources for the development of the program during the same period.
 - c. That on the balance sheet data after deduction of funds destined for the payments of dividends, it has a current ratio of at least 1.2: 1.0 and working capital of at least twice the monthly average of gross sales during the last 12 months.

20. For a period of 10 years after the signing of the contract, the borrower, the State of São Paulo, will comit itself to reinvest any dividend that will be eventually received from COMASP.
- 21 The loan funds in general shall not be used for goods and services already contracted and these shall be paid for with local funds; but in the case of the treatment plant, loan funds may be applied for goods and services that require foreign exchange.

SECTION II - TECHNICAL ANALYSIS OF THE EXECUTING AGENCY

- 2.01 The executing agency will be the Companhia Metropolitana de Agua de São Paulo (COMASP), the legislation for which is now pending in the State Legislature. COMASP will be responsible for the collection, treatment and transmission of water to be sold to the municipalities constituting Greater São Paulo. It will gradually take over from DAE the parts of the systems that produce water and DAE and the municipalities will then be responsible for distribution of the water to the users.
- 2.02 Prior to this, the complete water system had been operated and managed by the Departamento Estadual de Aguas e Esgotos (DAE). DAE was established in 1954 as a state agency with legal personality and administrative and financial autonomy, with the power to plan, execute, enlarge, improve and exploit, directly, the potable water supply and sanitary sewer system.
- 2.03 DAE now produces and distributes water for the cities of São Paulo and Osasco and only produces the water for the cities of Cotia, Guarulhos, Mariá, Santo André, São Bernardo do Campo and São Caetano do Sul which operate and administer their own distribution systems. In addition to this, DAE has signed agreements with the cities of Diadema, Embú, Carapicuíba and Barueri within the area of Greater São Paulo, to supply them with water. The cities will distribute the water and administer the internal systems.
- 2.04 To carry out its functions, COMASP will be established as a company of "mixed economy" with its shares controlled by the State and in accordance with the laws regulating such institutions. The organizational aspects of the two institutions (COMASP, DAE) in charge of carrying out the project are analyzed in Section VI, Paragraph 6.02 of this report.
- 2.05 COMASP shall have the power to set the price for the sale of water in bulk. This price, however, is limited by Art. 4 of the State Law # 9580 of December 30, 1966, for the municipality of São Paulo as follows:

<u>Quantity</u>	<u>Maximum Charge in Cruzeiros/m3.</u>
Minimum monthly consumption 15 m3.	.001 of minimum monthly wage
Monthly consumption 15 m3.	.0015 of minimum monthly wage.

- 2.06 Since the desired revenue may require a rate structure that exceeds these limits, provision should be made in the loan contract for the borrower (COMASP, DAE and the municipalities) to take the necessary action to permit the rates to be adjusted as needed so that these rate limits can be changed.

2.07. Description of Existing Facilities

2.07.1 Introduction

São Paulo is the principal city of Brazil and the capital of the State of São Paulo. It is located on the plateau north of the Serra do Mar which rises abruptly from the coast near Santos. The city is approximately 750 meters above sea level and lies in the beginnings of the drainage basin of the Rio Tiête.

The climate is mild and humid with an average temperature of 20°C and an average annual rainfall of 1,270 mm.

The city was founded in 1554 and in 1620 had a population of less than 200. In 1784, paving of the streets began and in 1792 a topographic map was prepared.

The first public supply was built in 1792. Water was brought from the Rio Anhangabaú to a storage tank, Santa Teresa, near Rua Santa Magdalena. Additional spring sources were developed and the water conducted to other tanks in 1864. People supplied themselves at the tank or from water wagons and vendors.

In 1877, the Companhia Cantareira de Aguas e Esgotos was established with 5,000 shares at 200 milreis each. The following year, 1878, the State Government became part of this company, thus making a "mixed economy" company.

In 1881, construction of the first distribution reservoir was completed. From this reservoir lines and house connections were extended, gradually replacing the public faucets and water wagons that had been used to distribute the water.

In 1885, the first sewer system was placed into service in São Paulo, thus establishing the water and sewer services of the city.

When the Companhia Cantareira did not have adequate financial resources to satisfy the increasing demand for these services, the State took over in 1892 and formed the Repartição de Aguas e Esgotos de São Paulo (RAE).

RAE managed the systems until 1954 when it was replaced by the present Departamento de Aguas e Esgotos (DAE). By that time, the city was served by almost 2,000 kms. of a water distribution network and 1,000 kms. of a sewage collection network.

2.07.2 Area Served

Greater São Paulo is made up of 38 "municipios" with a total area of 7,414 km². and an estimated population of 6,808,962 (1966). Of these, the municipio of São Paulo represents 75% of the population.

2.07.3 Sources of Water

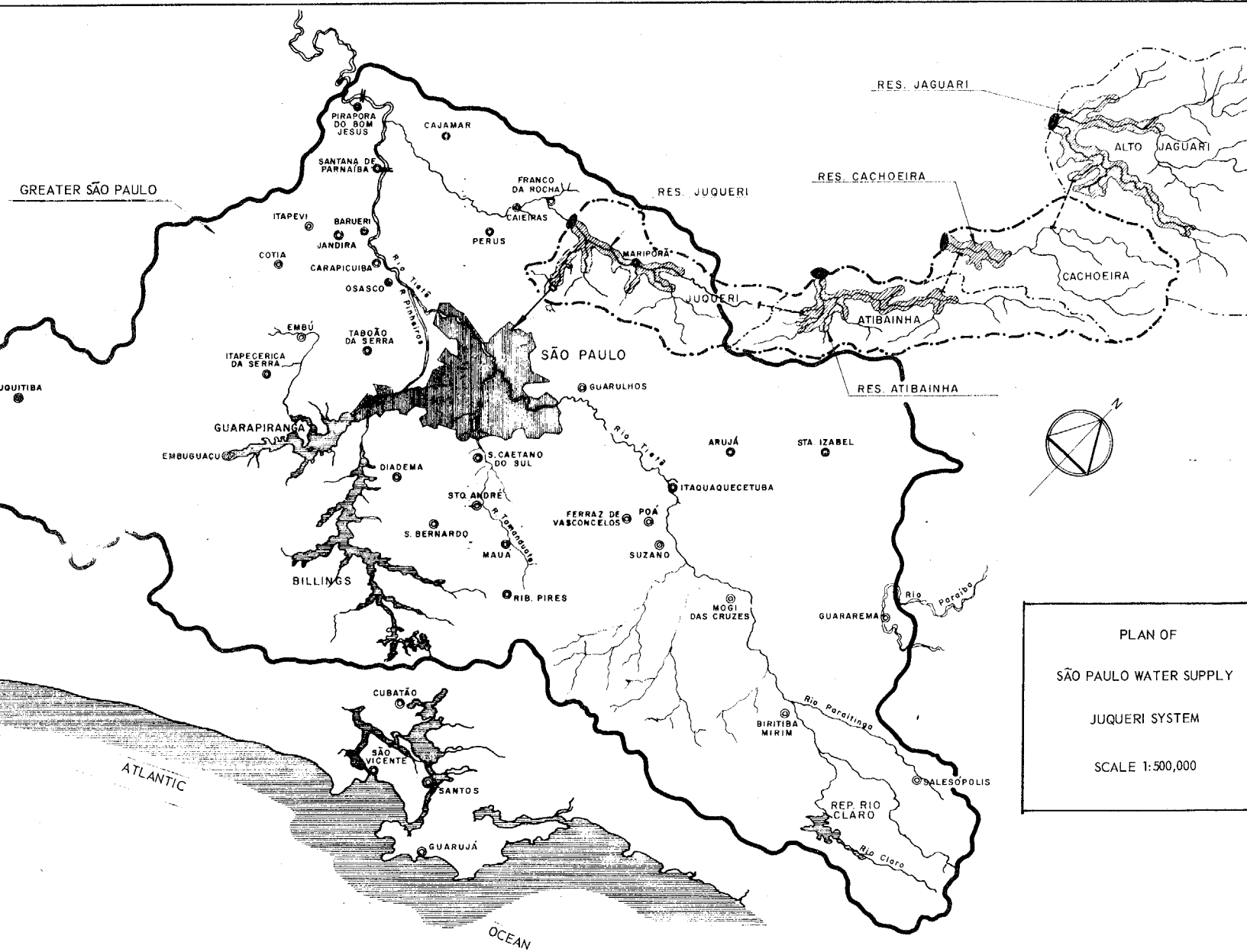
The present water supply for this area comes from 6 sources each of which may be considered as a system.

North	:	Cantareira, Cabuçu and others
South	:	Guarapiranga
East	:	Rio Claro
West	:	Upper and Lower Cotia
ABC	:	Rio Grande or Billings
Guarulhos	:	Tanque Grande (TG)

1. Cantareira. This was the first source of water for the public system. It collects several streams and springs in the Serra Cantareira and after chlorination delivers water to the higher city levels on the slopes of these hills. Its capacity is 0.2 m³/sec.

Cabuçu. This obtains water from the small Rio Cabuçu and conducts it to filter plant after which it serves the Serra Cantareira slope. It has a capacity of 0.5 m³/sec.

2. Guarapiranga. This system is supplied by water from a reservoir created by a dam on the Rio Guarapiranga built by the São Paulo Lite S.A. to produce electric power. From the dam the water is conducted by a canal to a pumping station with 14 pumps. From the pumping station the water goes through 8 force mains to two treatment plants at Alto da Boa Vista. From here it serves a major part of the population of São Paulo. It has a present capacity of 8 m³/sec. and a potential capacity of 14 m³/sec. This is the main source of water for the city.



3. Rio Claro. This obtains water from the Alto Rio Claro, 60 kms. southeast of the city and also supplies Salesópolis. It brings it through an 80 kms. aqueduct and treatment plant to the Moóca Reservoir from which it supplies other reservoirs and the southeast part of the city. It has a capacity of 2.6 m³/sec.

4. Alto Cotia. This obtains water from the Ribeirão Cotia approximately 50 kms. to the west and after storage and filtration supplies the western suburbs of the city lawn to the residential area Santo Amaro. The system has a capacity of 0.8 m³/sec.

Baixo Cotia. This obtains water from the mouth of the Cotia River, passes it through a treatment plant and pumps it to the Osasco and Vila Lara reservoirs. It has a capacity of 0.35 m³/sec.

5. Rio Grande (Billings). This system pumps directly from Rio Grande which flows into Lake Billings to a complete treatment plant from which it supplies the municípios of Santo André, São Bernardo do Campo and São Caetano do Sul (ABC). The present capacity of the system is 1.5 m³/sec.

6. Tanque Grande. This obtains water from the Serra Cantareira, approximately 30 kms. northeast of the city and supplies 0.15 m³/sec. to the Centro Industrial de Cubeca and a nearby airbase. It includes a dam, aqueduct, treatment plant, reservoir and elevated tank.

2.07.4 Dams

These systems have 6 dams ranging in height from 5.5 m. to 20 m. and in length at the crest from 50 to 300 m. The dams are of masonry and concrete.

FIG. 2

List of Dams

<u>Name</u>	<u>Class</u>	<u>Height Meters</u>	<u>Length at Crest Meters</u>
Pedro Beicht	Masonry and stone	12.0	300
N.S. das Graças	Masonry	5.5	50
Engordador	Earth	5.5	60
Cabuçu	Arch concrete	10.0	75
Poço Preto	Cyclopean concrete	9.0	70
Ribeirão do Campo	Concrete	20.0	200

2.07.5 Pumping Stations

DAE operates 13 pumping stations with almost 114 pumping units requiring approximately 42,000 H.P. These include raw water, finished water and booster pumping stations.

The largest pumping stations are the Guarapiranga with 14 units at 1 m³/sec. each; the Jardim Paulista with 5 units at 1 m³/sec. each; the Jabaquera-Chacara Flora with 8 units at 500 liters/sec. each; and Franca Pinto with 6 units at 500 liters/sec. each.

2.07.6 Treatment Plant

The various systems require the operation of 14 chlorination stations and 9 water treatment plants.

Alto da Boa Vista. The largest treatment plant is that of Alto da Boa Vista, built in 1956. It has a present production of 6 m³/sec. and a future capacity of 20 m³/sec. It is part of the Guarapiranga system and its final enlargement will depend on additional water from developments on Capivari-Monos Rivers.

It is a conventional plant operating at 120 m³/m²/day. It has alum and lime clay feeders, rapid mix in a Parshall Flume, mechanical flocculation, rectangular sedimentation basins, rapid sand filters, surface wash and washwater pumps and gas chlorinators.

Prof. Teodoro Ramos. This plant is part of the Guarapiranga system and was built in 1929. It is of the conventional type with a present production of 1 m³/sec. The filter equipment was changed in 1954 and in 1963. It consists of liquid lime and alum feeders, hydraulic mixing and flocculation, rectangular settling tanks and a solids contact clarifier and rapid sand filters with false bottoms. The filter rate is 180 m³/m²/day.

Casa Grande. This plant is part of the Rio Claro System and is supplied by gravity from this river. In the dry season, additional water is provided by two pumping stations in the Rio Claro and if necessary from the Guaratuba River. At certain times of the year, the water is of such good quality that treatment is not needed.

The production of the plant is 2.5 m³/sec. It consists of lime slaking tanks, alum tanks for feeding coagulants, rapid mixing by means of a hydraulic jump, flocculation by means of a baffled channel, rectangular settling basins, and rapid sand filters. The filters are backwashed with water from an

elevated tank. The water is chlorinated at various locations in the transmission main.

Morro Grande. This plant belongs to Alto Cotia System and was built in 1916. It is of the conventional type with a production of 0.85 m³/sec. The water is chlorinated at the plant.

The plant has wet lime feeders, hydraulic mixing, flocculation by means of vertical baffles, settling basins and rapid sand filters. The rate of filtration is 120 m³/m²/day.

Backwashing is done with water from an elevated tank.

Baixo Cotia. This plant was completed in 1963. It operates at a rate of 0.2 m³/sec. but has a capacity of 0.5 m³/sec. The water is of poor quality receiving meatpacking, chemical, slaughterhouse and sanitary wastes.

The treatment consists of lime and alum solution feed, rapid mixing in a Parshall Flume, mechanical flocculation, rectangular sedimentation basins, Degremont filters, and 2 chlorinators.

Cantareira. This water is of good quality coming from a protected watershed. It has a capacity of 0.2 to 0.4 m³/sec. The water is collected in reservoirs and chlorinated prior to distribution.

Cabucu. This plant was built in 1954 in the Barrio of Santana. It has a capacity of 0.5 m³/sec. but operates at 0.4 m³/sec. It is of the conventional type.

It has lime and alum solution feed, mixing and flocculation in a baffled channel, rectangular settling basins, 4 rapid sand filters and gas chlorinators.

Cumbica. This plant was built with private initiative and taken over by DAE in 1958. It has a capacity of 0.05 m³/sec.

It is of the conventional type with dry feed of lime and alum, rapid mix by means of a "hydraulic jump", flocculation in a baffled channel, rectangular settling basins, rapid sand filters operating at 120 m³/m²/day, and chlorinators.

Billings. This plant was built in 1958 to supply water to the municipios of Santo André, São Bernardo do Campo and São Caetano do Sul. It is considered to be one of the most modern in Brazil.

Present capacity : 0.9 m³/sec.
 Future capacity : 2.0 m³/sec.

The treatment consists of lime and alum feed, rapid mix, slow mix, sedimentation, rapid sand filtration, chlorination, Ph adjustment, and the use of active carbon and clay.

There are 7 rectangular settling basins with mechanical sludge removal.

There are Dorr type mechanical flocculators with horizontal axis.

There are 14 rapid sand filters, false bottom with porcelain diffusers, and Palmer surface wash.

Summary of Data

The capacity of the treatment plants is shown below:

FIG. 3

DAE Treatment Plants (1)

	Capacity m ³ /day	System
Teodoro Ramos	173,000	Guarapiranga
Alto Boa Vista	520,000	Guarapiranga
Casa Grande	250,000	Rio Claro
Morro Grande	90,000	Alto Cotia
Baixo Cotia	15,000	Baixo Cotia
Cabuçu	35,000	Cabuçu
A B C	130,000	A B C
Cumbica	7,000	Tanque Grande

(1) It should be noted that the different reports give different values for the present production rates and rated capacities.

2.07.7 Reservoirs

There are 35 ground storage reservoirs with a combined capacity of 435,930 m³. and 18 elevated storage tanks with a combined capacity of 6,200 m³. There is under construction a storage tank of 13,000 m³. at Vila Jaguaré. The capacity of the reservoirs is adequate for the needs of the city. But because of the limitations of the distribution system, little flexibility in their use to supply other areas not in their immediate vicinity is possible.

The largest ground storage tanks are the following:

FIG. 4

Major Reservoirs (')

Moóca	72,000 m3.
Consolacao Nôvo	42,000
Lapa	26,000
Vila América	26,000
Consolacao Velhe	19,000
Jabaquera	18,000
Penha	16,000
Mirante de Santana	16,000

(') DAE report of June 1967.

2.07.8 Distribution Network

The condition of the system with respect to leakage has been the subject of controversy. It is stated that approximately 500 kms. of the network must be replaced or repaired.

Extensions to the system were halted in 1962 because of the lack of water, leaving entire barrios and settlements, without service. In certain areas such as the North Zone, the situation is critical.

There are approximately 5,792 kms. of mains and distribution lines of 3" to 40" in diameter. The majority of the lines, 3,604 kms., are 3" diameter.

FIG. 5

Present Distribution Network (1)

<u>Diameter</u> <u>Inches</u>	<u>Length</u> <u>Kms.</u>	<u>Material</u>
3	3,604	Cast Iron Pipe
4	570	Cast Iron Pipe
6	484	Cast Iron Pipe
8	263	Cast Iron Pipe
10	179	Cast Iron Pipe
12	250	Cast Iron Pipe
14	90	Cast Iron Pipe
16	61	Cast Iron Pipe
18	56	Cast Iron Pipe
20	39	Cast Iron Pipe
22	45	Cast Iron Pipe
24	34	Cast Iron Pipe
26	6	Cast Iron Pipe
28	17	Cast Iron Pipe

<u>Diameter</u> <u>Inches</u>	<u>Length</u> <u>Kms.</u>	<u>Material</u>
32	6	Cast Iron Pipe
40	11	Cast Iron Pipe
16 (2)	2.5	Concrete, reinforced
27 (2)	13.5	Concrete, reinforced
30 (2)	6.7	Steel
36 (2)	4.2	Steel

(1) DAE report of June 1967.

(2) Consisting of the ABC System.

2.07.9 Connection and Metering

All sources of water except the Rio Claro aqueduct which is indirectly measured, are metered directly by means of Venturi meters or hydrometers.

There are approximately 600,000 connections of which 85% are metered and 15% with flow control valves. The usual size of the connection is 3/4". Many of the meters cannot be relied upon because the program of inspection and repair has been limited. The classification of users by connections, industrial, commercial, etc., has not been supplied. This is an important factor for the operation of the loan.

The estimated population served in the metropolitan area is 3,350,000 people, leaving approximately 3,500,000 unserved.

In 1966, 22,200 new house connections were made representing nearly 120,000 people.

The property owner has been responsible for supplying the meter and paying a nominal charge for its installation by DAE. As a consequence, 8 different types of meters have been used. DAE has a meter shop with a capacity of 50 units per day.

Bills are sent out on a quarterly basis. The billing is difficult because of the antiquated method of work in recording the meter readings and preparing the bills as well as the difficulty in determining the addresses of the users. The city frequently changes street names and numbers.

2.07.10 Sewer System

The present sanitary sewer system serves approximately 20% of the population in Greater São Paulo.

The main lines follow in a general way the valleys and where necessary pumping stations have been built to raise the water into the streams.

The area served, including the municipios ABC, delivers its sewage into the Rivers Tiête, Tamanduatú, Pinheiros and their tributaries. These 3 rivers receive a very high pollution load and the treated and untreated sanitary and industrial wastes entering them are pumped to the Billings Reservoir, also known as the Rio Grande.

The average pumping rate is 75 m³/sec.

In July 1967, Hazen and Sawyer completed a study for the disposal of sewage of São Paulo. Four schemes were analyzed and the one selected provided for converting Billings Reservoir into a supply for São Paulo. The first stage of this sewer is estimated at US\$ 400,000,000.

The present system consists of 270,617 house connections; 2,408.49 kms. of laterals and collectors; 3 pumping stations and 2 sewage treatment plants.

The domestic sewage flow including commercial, light industry and infiltration is estimated at 5 m³/sec. (DAE report of June 1967) and the flow from heavy industry at 5 m³/sec.

2.08

Technical Capacity of the Executing Agency

According to the law establishing COMASP, this agency will be responsible for the collection, transmission, treatment, and delivery of water to be sold in bulk to the municipios that constitute Greater São Paulo.

By the end of March 1968, 3 of the 4 directors governing COMASP had been appointed including the Director-President. The Director is a highly trained man with approximately 20 years of responsible experience in Brazil and in international work.

In addition, a basic group of professionals has been appointed for the technical-administrative needs of COMASP and includes a chief engineer and 17 engineers, each with more than 10 years experience; an economist; 6 surveyors and 6 designers; and 3 accountants.

This minimum staff shall be responsible for administering the program, review and approval of plans, specifications, bidding documents, receipt and award of bids, and contracts, general supervision of construction, financial management, etc.

2.09 Operation and Management

The operation of the Juquerí System will require the care and maintenance of 3 dams and reservoirs, tunnels and canals, a pumping station with very large equipment, large metering equipment, and cost accounting.

The staff will not be large but will need to be highly trained and of a high professional level.

Skilled personnel are available in DAE and in São Paulo because of its heavy industry. If adequate salaries are paid, and the operators and administrators are properly trained, no problems are foreseen.

SECTION III - OTHER SIMILAR WORKS IN PROCESS3.01 Current Status of Other Works Being Executed by the Same Agency not Financed by the Bank

For the past two years work has been underway to develop additional sources of water for São Paulo. These works are part of the project under consideration and have been designed to fit into the master plan.

The chart below shows the physical progress and costs of the contracts that have been let.

FIG. 6Present Construction

	Physical Progress	Contractor	Contract Amount NCR\$.
1) Juquerí Dam	May 1967 20%	Azevedo and Travasso	4,216,000
2) Covered Canal and Tunnels	50%	Heleno and Fonseca	3,939,000
3) Tunnel No. 2	10%	Mendes Junior	6,759,000
4) Guaraú Filter Plant Site	10%	Constructors Alcindo S. Vieira	15,000,000
			<hr/> 29,914,000

Note: Rate of exchange : NCR\$ 2.70 to US\$ 1.00

The engineering firm of SERETE was hired April 1967 as consultants to DAE on the Juquerí Project and continued reviewing the basic data, criteria, the overall project as well as the topography, hydrology, and the status of the work in execution. The staff of SERETE was complemented as needed with special consultants: Mr. G. Gerdes, hydraulic engineer, Mr. William Aultman, sanitary engineer for water treatment, and Mr. T. Thompson, for geological problems.

SECTION IV - TECHNICAL ANALYSIS OF THE PROJECT

It is to be noted that outline plans and specifications are in the process of preparation for every part of the project and 4 construction contracts have been let. Final plans and specifications are needed for the majority of the works as well as geological and topographical studies. In the description that follows, reference is made to the additional plans and studies required, which later should be reviewed and approved by the Bank's Project Engineer.

4.01 Technical Description4.01.1 Juquerí Dam

A unit price contract for its construction was let on October 14, 1966. The dam is 180 m. long at the crest and 23 m. high above the river bed. Foundation rock is about 15 m. below the river bed and close to the surface on the right abutment. The dam is of the homogeneous clay type with a 1 on 3.5 slope upstream and a 1 on 2.75 slope downstream. It has a sand filter located about 1/3 of the way down the downstream slope. The cutoff wall is being formed by a 20 m. deep x 0.50 m. wide trench dug down to bed-rock along the dam centerline and filled with a bentonite slurry. Grouting will be needed on both abutments.

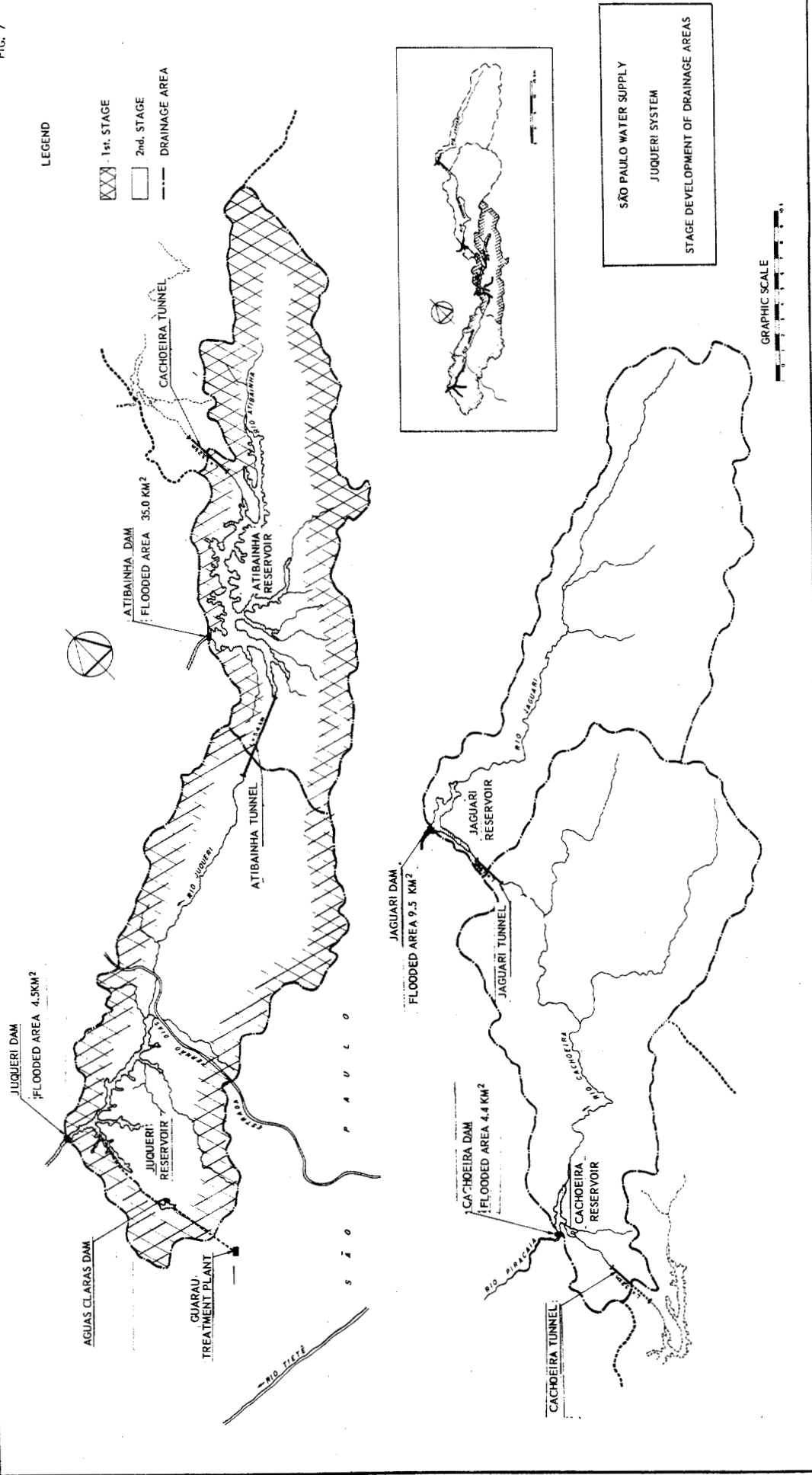
Diversion will be accomplished by a rock fill coffer dam that will be incorporated in the upstream toe of the dam. The water will then flow through a 2.5 m. diameter tunnel. By October 1967, the tunnel had been holed through and was being lined.

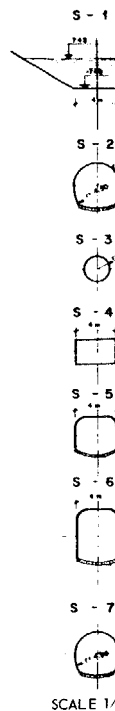
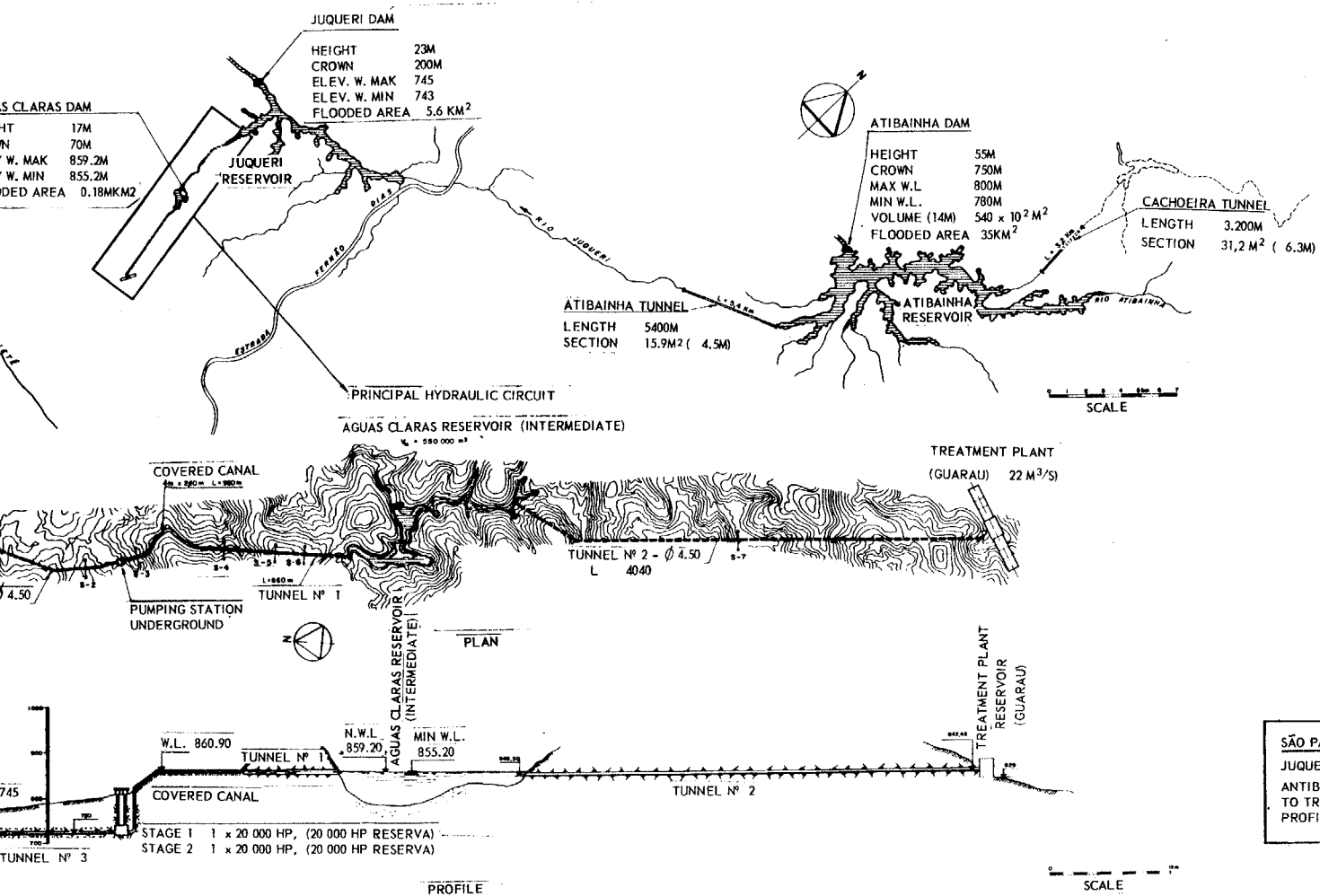
The spillway will be located in a side channel in the right abutment. It is being redesigned from a capacity of 200 m³/sec. to carry a flow of 400 m³/sec. and will be provided with a Tainter Gate (8 x 15 m.) to maintain the desired level and provide flood relief. This design should be carefully reviewed.

The critical level of the reservoir created by the Juquerí Dam is the elevation that would cause flooding at the town of Mairiporã upstream. This is taken care of by the size of the spillway and the Tainter Gate which can be opened as needed.

The reservoir site will be cleared of trees and brush in the flooded area estimated at 500 hectares. To avoid possible contamination, sewage collection and disposal system will be provided for the town of Mairiporã (population 5,000), which lies in the watershed.

FIG. 7





SÃO PAULO WATER SUPPLY
JUQUERI SYSTEM
ANTIBAINHA - JUQUERI SYSTEM
TO TREATMENT PLANT AND
PROFILE OF MAIN HYDRAULIC

4.01.2 Intake Canal and Tunnel

These works are in the process of design. An intake canal to conduct water from the reservoir through a tunnel to a pumping station will be constructed along one of the streams that flows into the Juquerí River, the Ribeirão Santa Inez. It will begin at elevation 733 about 500 m. south of the mouth of the stream and continue south for a distance of 3 kms. to the village of Santa Inez. It will be approximately 30 m². in cross section, 4 m. wide at the bottom with side slopes of 1 on 2 and a gradient of 0.2 m. per kilometer to the south. The depth would be from 1 meter to 5 meters.

This canal would be needed only at long intervals when the Juquerí Reservoir is lowered to elevation 735.

Near the village of Santa Inez, the canal will meet a tunnel which will conduct the water to the underground Santa Inez pumping plant. This tunnel would have a capacity of 22 m³/sec., approximately 1,200 m. long, a horseshoe section, and 5 m. diameter. It is planned to leave it unlined if the geological conditions permit. It would be provided with a shut-off gate for dewatering.

4.01.3 Santa Inez Pumping Plant

The site was selected on economic consideration and is close to the beginning of the existing high level covered canal. This is still in the process of design.

Depending on the results of the geological explorations, the pumphouse may be underground or in the open. It would be 10 x 27 m. in plan and 20 m. high. The intake tunnel would extend under the pump suction.

The plant will be underground with an ultimate installation of three 11 m³/sec. pumps. Present plans are being studied to determine the desirability of using horizontal centrifugal pumps, rather than vertical pumps.

The first stage installation (this project) will consist of two 11 m³/sec. pumps with a Total Dynamic Head of 125 m. This would require motors of 20,000 H.P. The outline data is as follows:

FIG. 9

Outline Data for Pumping Station

Unit Capacity m ³ /sec.	11
Design Head (Meters)	125
Horsepower	20,000
R P M	514
Outlet Diameter (Meters)	1.4
Specific Speed (English Units)	104
Positive Suction Head (Meters)	10

The pump units would be driven by 13.8 KV motors at 514 RPM. The pumps would be provided each with a 54" diameter spherical type discharge valve and a 1.60 m. ring follower type sliding valve in the suction for unwatering and maintenance.

Large pumps of this size have been built by several leading manufacturers and have been in operation for several years. Appendix #1 shows some selected pump characteristics for large pumps.

Access would be by a working platform and a personnel elevator.

The 13.8 KV cables would extend to the surface where the control room and high and low voltage switching would be located.

Power would be supplied over a 2 circuit 88 KV line, 20 kms. long from the Terminal Norte which is the 345 KV junction of the Furnas and São Paulo Light System. Cost of this line would be refunded out of power bills. There would be two 3-phase transformers with a single 13.8 KV bus and the usual 220/110 V auxiliary circuits as well as the normal services, controls, and informational apparatus. To energize the station service a 20 KW diesel generator would be provided.

The pumps will discharge through a pipe manifold into a 2.40 m. diameter pipe which extends through the rock and a surface trench to the covered canal. The pipe would be of coated and wrapped steel with cathodic protection.

4.01.4 Canals and Tunnels from Santa Inez to Guaraú

Covered Canal. This covered canal of reinforced concrete, 4.0 x 1.4 m., is already built for 740 m. and goes from the end of the proposed pipeline to Tunnel No. 1. It will be extended 240 m. north to meet the end of the force main from the Santa Inez pump plant. It is under contract to Heleno and Fonseca.

Tunnel No. 1. This is under construction by Heleno and Fonseca. It will be of a horseshoe section 4.0 x 5.0 m., and unlined where conditions permit. It will be 860 m. long and connect the covered canal with the Aguas Claras Reservoir to be created by the construction of a small 20 m. high dam on one of the tributaries of the Ribeirão Santa Inez.

Reservoir Aguas Claras. This is an intermediate reservoir between Tunnel No. 1 and Tunnel No. 2, which leads to the Guaraú Filter Plant. This reservoir will provide a storage capacity of 1,600,000 m³. and 11.5 m. head for Tunnel No. 2.

It will be formed by a dam 25 m. high on the Ribeirão Aguas Claras.

Foundation and soil studies are being made to determine the type of dam to be built, whether of reinforced concrete or rock fill.

4.01.5 Tunnel No. 2

This is a tunnel 4,850 m. long under contract to José Mendes Junior. Work has been started on both ends of the tunnel and the tunnelling has progressed a few hundred meters. The tunnel will be 5 m. in diameter and unlined, except for broken rock sections.

Broken rock has been encountered in both cases, and the consulting engineers are making soil borings and studies to determine whether the north portal could be moved 500 m. south and the tunnel alignment could be modified to obtain better geological conditions.

This would result in a possible saving of 500 m. tunnel and the reduction in lining of the tunnel.

4.01.6 Guaraú Treatment Plant and Filtered Water Storage Tank

Two sites were considered for the location of this plant and a technical and economical comparison made. It was decided that the Guaraú site was the more favorable. Considerable earthmoving has already been done at Guaraú. The final preparation of this site still requires much additional earthmoving and is under contract to Alcindo S. Vieira.

The plant is being designed for an ultimate capacity of 22 m³/sec. and certain parts will be built to this size in this project. These include the main influent and effluent lines, chemical and head house, the common supply channels between the structure and the wash water tanks. The other parts of the plant will be built in multiple units such as the flocculation basins, sedimentation basins, and filters for an initial capacity of 11 m³/sec.

The plant will be laid out so that expansion will not interrupt its operation.

Preliminary layouts have been prepared and detailed plans and specifications are required. The plant will be of the conventional type and require a future area of approximately 800 x 100 meters. It will have mechanical mixing and flocculation mechanically cleaned, sedimentation basins, rapid sand

filters operating at 2 to 4.5 gpm/sq.ft., filtered water storage tank of 400,000 m³, and a clear well of 3,870 m³ capacity. The chemical feeding equipment will be in a separate building with ample space for storage.

4.01.7 Main Feeder Lines from the Guaraú Plant

Large diameter lines with capacities of 1, 2, 4 and 6 m³/sec. will connect the storage reservoir at Guaraú with principal reservoirs in the North and Southeast areas of the city. Similar lines will also strengthen the supply to the Northeast and Northwest zones of the city. In this way, approximately 60% of the water will be utilized in the northern half of the city, and 23% will be for industrial use.

The final design of these lines will depend on the information obtained from a study of the distribution system and the strengthening and operation of the various reservoirs and pumping stations.

4.01.8 Distribution Network

The improvements to be done here will be outside the project. They will consist of extensions to the distribution systems that were halted in 1962 due to the lack of water, improvement of existing pumping facilities, interconnections and strengthening of the reservoirs, and standardization and replacement of meters.

The areas to be served are primarily north of the Rio Tiête, with some water being to the Alto do Moóca Reservoir which feeds the southeast zone of the city.

DAE will be responsible for the distribution system and is planning to strengthen and extend the system to meet the demands. The financing will be done with local funds and charges derived from the property improvement law.

Provisions should be made in the loan contract to ensure that DAE will present a technical and financial program for extending the distribution system as well as replacing and installing water meters.

4.01.9 Atibainha Dam and Tunnel

This dam has not yet been designed. It is proposed to build a dam 55 m. high with a length of 750 m. at the crest. It would create a reservoir of 35 km². and store 540,000,000 m³ of water. This reservoir would have adequate elevation so that the water could flow by gravity into the Juquerí Reservoir.

From the Atibainha Reservoir, there would be a tunnel in a westerly direction discharging into the Ribeirão Juquerí Mirim which flows into the Juquerí Reservoir. The tunnel would be approximately 5.4 kms. in length, 4.5 m. in diameter in rock and geology permitting, unlined.

Topographic and geological studies will be required to locate and make the final detailed design of the dam and tunnel.

4.02 Basis of Need for the Project

4.02.1 Present Supply of Water

The present supply of water in São Paulo is greatly deficient and needs to be almost doubled to satisfy the domestic consumption. It supplies approximately half the water needed by the present domestic population but cannot supply that needed by industry. The present supply is 14 m³/sec. of which only 70% is domestic consumption.

Industry provides its own water by treating waste waters and from a limited number of wells since the public supply is inadequate and furnished approximately 4% for industry. The total amount required by industry is nearly 7 m³/sec. A survey made in 1967 indicated that industry obtained 70% of its water from rivers, 20% from wells and the remainder from the public system.

FIG. 10

Supply of Water - Greater São Paulo in 1966-67

	<u>Urban Population in 1,000(')</u>	<u>Population Served in 1,000</u>	<u>% Urban Population Served</u>	<u>Water Supplied in m³/sec.</u>
São Paulo-Osasco (DAE)	4,568	2,870	63	12.78
ABC - Municípios	693	394	57	1.40
Guarulhos	108	77	71	0.18
Small Municipalities served by DAE	66	24	37	0.050
Municipalities with independent systems	329	129	39	0.28
Municipalities without systems	97	-	-	-
	<hr/> 5,861	<hr/> 3,494	<hr/> 60	<hr/> 14.69

(') Rural population is outside the system and was estimated at nearly 1,000,000 in 1966.

The water consumption is distributed as follows:

Domestic	70%	
Commercial	6%	
Industrial	4%	(1)
Others	20%	

100%

(1) In industrial cities, this ranges from 20-50%.

On this basis, the average domestic consumption for the areas served is on the order of 200 liters per capita per day. This is not enough for the days of maximum demand nor during the peak hours, resulting in serious shortages.

As a result of this lack of water, various areas of the city are supplied intermittently at great intervals. The situation is aggravated by the "zoned" distribution system that does not permit flexibility of distribution from one zone to another and the difficulty of synchronizing the numerous pumping stations that handle 70% of the water.

The operation of the system is complicated and requires the opening and closing of many valves, the combined operation of many pumping stations to distribute the limited amount of water.

The present deficit of water which is estimated at 10 m³/sec. increases approximately at the rate of 1 m³/sec/year because of the population growth of Greater São Paulo.

Population Growth

The population of Greater São Paulo is estimated to be growing at 5% per year due in great measure to immigration from poorer areas. Various analyses have been made for the future population of the area based on growth curves, comparisons with other cities, statistical analyses and saturation theory. These estimates give a population of 18 to 20 million people in the year 2,000.

4.03

Design Criteria and Current Status of Design

4.03.1 Basic Criteria

Two of the basic criteria considered in this project were that the water supplied would be mainly for domestic consumption and would go primarily to the northern zone and other areas of comparatively low income. Moreover, additional sources were needed which could be developed in a relatively short time and by increments. After reviewing various projects, the Juquerí was selected and work began in 1966.

A master plan for the preparation of construction drawings, specifications, purchase of equipment and the award of contracts has been prepared and is summarized as follows:

FIG. 11

Engineering Program

	No. of Contracts	No. of Drawings			
		Basic	Contract	Construction	Equipment
Atibainha Dam and Canal	6	20	90	180	180
Juquerí Dam and Aguas Claras Aqueduct	8	40	120	360	310
Santa Inez Pumping Station	5	25	90	350	680
Treatment Plant	5	60	600	135	560
Supply Lines	6	15	60	300	-
	30	160	960	1,325	1,730

Under the general supervision of the executing agency, the principal consulting firms will do the overall planning and programming. In accordance with this plan, the other participating consulting firms will carry out the program described in Fig. 11, preceeding.

4.03.2 Consumption

Based on the estimated population growth and previous consumption experience, it was determined that a reasonable per capita consumption would be 400 lpd and that 85% of the population could be served by the public system. The remainder in fringe areas and beyond the public services ("rural") could only be served by individual systems. The estimates arrived at seem reasonable.

FIG. 12

Estimate of Water Required for Domestic Consumption

Y e a r	Estimated Population Greater São Paulo	85% Population at 400 lpcd - m3/sec.
1968	6,500,000	25.68
1970	6,800,000	26.75
1980	9,700,000	38.17
1990	13,100,000	51.55
2000	18,000,000	70.83

4.03.3 Sources of WaterQuality

The Rio Juquerí water is of good quality. An abstract of the water analysis is given below:

FIG. 13Rio Juquerí Water Analysis (1)

	<u>D a t e</u>		<u>C o m m e n t s</u>
	<u>10/54</u>	<u>2/64</u>	
Color	125	150	
Turbidity	32	75	Low turbidity
pH	7.0	6.5	Neutral to slightly acid
Hardness	-	16.0	Very soft water
Chlorides	1.2	1.0	Very low chlorides
Alkalinity	11.0	21.0	Low alkalinity

Quantity

Data was available for 31 years on the flow of the Rio Juquerí downstream of the proposed dam at Gato Prêto where the drainage area was 621 km². This information was used to calculate the respective flows at the proposed Juquerí and Atibainha damsites for this stage of the project as well as the damsites on the Cachoeira and Jaguarí damsites for the future stages. From these flows, the effect of the storage dams on regulating the flows was calculated and the individual and combined yields determined as follows:

FIG. 14Streamflows in m³/sec. - 31 Years Data (2)

	<u>P r o j e c t</u>			<u>Future Stage</u>		<u>Total Est. Flows</u>
	<u>Gato Prêto Station 621 km²</u>	<u>Juquerí Dam 355 km²</u>	<u>Atibainha Dam 304 km²</u>	<u>Cachoeira Dam 400 km²</u>	<u>Jaguarí Dam 374 km²</u>	
Natural flow	10.4	6.0	5.2	6.8	6.3	24.3
Regulated flow	-	5.6	4.9	6.6	6.2	23.2

- (1) Two typical selected analyses, DAE report of September 1967.
- (2) Annual rainfall at Mairiporã, 1,361 mm.; drainage area, 125 km²., and flows, 22 m³/sec.

Allowing for downstream use and the maintenance of a minimum dry weather flow in the Juquerí, it is believed a safe yield of 10 m³/sec. can be obtained in the first stage and 22 m³/sec. in the second stage.

4.03.4 Dam and Spillway Design

The Juquerí Dam is a low dam with an impermeable core and provision for drainage of seepage.

The spillway design is based on hydrological data of Gato Preto that is incomplete for some high flows. Its capacity should be carefully reviewed because this type of dam cannot be overtopped and because of the danger of flooding the town of Mairiporã upstream.

As presently proposed the spillway will have a capacity of 400 m³/sec. and a 6 x 12' Tainter Gate.

The Atibainha Dam and Aguas Claras Dam designs will depend on the topographic and geologic studies to be made.

Tunnels and Canals

The following hydraulic criteria have been used for the tunnels and canals:

FIG. 15

Hydraulic Design Data

Type	T u n n e l			Covered Canal		Force Main
	3.5 m. Lined	5.0 m. Unlined				
Plan and diameter				2.4 x 4.0 M.		2.40 m. ϕ
Capacity m ³ /sec.	18.00	22.00	22.00	18.0	22.0	22.0
Area m ² .	9.62	9.62	19.60	9.60	9.60	4.5
Manning "n"	.012	.012	.031	.012	.012	.010
Velocity m/s	1.87	2.40	1.12	1.87	2.40	4.9
Slope m/km.	0.76	0.89	0.90	0.68	1.027	5.2

This design is in accordance with good engineering practice. However, the lining of the tunnel will depend on the type of rock encountered in the excavation and an extensive program of soil investigation should be carried out to locate the best route and determine the most adequate type of tunnel.

4.03.5 Pumping Station

Based on economical and technical comparison of alternate plans, it was decided to put the pump station underground. In the final installation there would be 3 pumps of 20,000 HP each, 2 operating and 1 standby.

This project would provide for 1 operating and 1 standby of 11 m³/sec. each. The pumps are large (250 MGD) and would have to be especially designed and built for this job. Preliminary estimates indicate that nearly 18 months would be required for delivery.

These units are the critical part of the whole project and control the time when water can be delivered from the system.

Special attention should be given to the bidding procedures and specifications so that only manufacturers with successful experience in providing equipment of the same or larger sizes shall be accepted through prequalification for final bidding.

Alternate designs for vertical and horizontal pumps are being compared. The piping layout, controls, and accessories as proposed are standard for this type of installation.

4.03.6 Treatment Plant

The topography to a large extent determined the location of the plant and the space available. This forced the designers to use an extended layout for the plant. Excavation of the site is nearly complete and the next phase -- soil borings -- can now be undertaken. Detailed designs and equipment selection needs to be made.

Outside consultants familiar with the design construction and operation of filter plants of this size have been called in. The final stage of this treatment plant will make it one of the larger in South America with a capacity of nearly 500 MGD.

FIG. 16Estimated Status of Design (1)

	Soil Borings	Degree of Completion	
		<u>Outline Plans</u>	<u>Final Plans and Specifications</u>
Atibainha Dam and Tunnel	To be planned	5 %	To be done
Juquerí Dam and Tunnel	In execution, 40% complete	100 %	80% (spillway)
Santa Inez Pumping Station	In execution, 10% complete	10 %	To be done
Guaraú Treatment Plant	To be planned	20 %	To be done
Aguas Claras Dam and Aqueduct	In execution, 20% complete	50 %	40 %
Main Supply Lines	To be planned	To be done	To be done

(1) Estimated from documents supplied DAE Reports of June, September 1967, progress reports of SERETE, and plans available in DAE.

4.04 Review of Cost Estimates

The cost estimates for the Juquerí Dam, the canals, the access roads, the mechanical and electrical equipment are based on fairly complete plans and the use of well-defined materials.

The costs for the tunnels, and the Aguas Claras and Atibainha Dams have been estimated with a limited amount of geological and topographical data. The final dam sizes, type and depth to bedrock will be determined when the studies are more complete. The estimates for length of the tunnels and the need for lining are also in the same condition.

The final layout of the treatment plant and pumphouse will affect the size and cost. Here again, the required geologic studies will determine the type of foundations and structure.

The costs for the main distribution lines are more difficult to estimate since the exact locations have not yet been determined. These lines will run through congested districts where there will be interferences from traffic, other utilities, and varying soil conditions. There will also be the problems of interconnecting them to existing mains and reservoirs.

The estimates presented have made reasonable allowances in the costs estimates for the various items and provided an overall contingency of 10%.

- The cost of the engineering services which include design, supervision and assistance in purchasing are less than 5% and are in accordance with this normal costs for works of the size and difficulty.

FIG. 17

Project Cost (')
in US\$ 1,000

	<u>I D B</u>		<u>L O C A L</u>		<u>T O T A L</u>		
	<u>Costs in</u>		<u>Costs in</u>		<u>Costs in</u>		
	<u>Foreign</u>	<u>Local</u>	<u>Foreign</u>	<u>Local</u>	<u>Foreign</u>	<u>Local</u>	<u>Total</u>
Atibainha Source	2,240	-	-	11,960	2,240	11,960	14,200
Juquerí Source and Aqueduct	-	1,850	-	6,050	-	7,900	7,900
Pumping Station	1,900	-	-	1,650	1,900	1,650	3,550
Treatment Plant	910	-	-	30,090	910	30,090	31,000
Main Supply Lines	3,500	1,875	-	5,965	3,500	7,849	11,340
Engineering and Design	1,150	500	-	1,350	1,150	1,850	3,000
Supervision (COMASP)	-	-	-	1,000	-	1,000	1,000
Administration	-	-	-	5,525	-	5,525	5,525
Parallel Studies	-	-	-	1,390	-	1,390	1,390
Technical Assist- ance	500	-	-	420	-	420	920
IDB Inspection & Control	300	-	-	-	300	-	300
Interest During Construction	1,775	-	-	100	1,775	100	1,875
<hr/>							
T O T A L	12,275	4,225	-	65,500	12,275	69,725	82,000
<hr/>							
	16,500		65,500		82,000		

(') Each item includes 10% for contingencies.

4.05 Alternatives Considered and Costs Thereof

4.05.1 A review of the geology in the area and the available data for approximately 1,000 wells was made and it was decided that the groundwater yield was not large enough to be considered as an additional source of water.

4.05.2 A special Comissão Especial para o Planejamento das Obras de Abastecimento e Distribuição da Capital (CEPA), created by DAE in 1962, prepared a plan for developing additional water supply based on the evaluation of various proposed surface systems.

Based on these studies, DAE selected Juquerí for initial construction.

The relative costs of 5 sources as derived from these analyses is shown below:

FIG. 18

Relative Cost of Alternate Water Sources

<u>N a m e</u>	<u>Cost Factor</u>	<u>Yield</u>
Guarapiranga	1.0	3.3
Baixo Cotia	1.1	0.15
Lake Billings (Rio Grande)	1.4	4.0
Rio Claro (Alto Tiête)	1.4	4.6
Juquerí and Diversions	1.5	17.0
Alto Cotia	1.8	-
Capivari-Monos-Mandú (Guarapiranga)	2.0	5.5
Itatinga and Itapanhau (Rio Claro)	2.2	9.2
Juquiá	3.0	-
Paraíba (into Alto Tiête)	3.5	-
Camburu (into Rio Claro)	4.5	-

4.05.3 The Paraíba River is a large river east of São Paulo, drains 30,000 km² and flows eastward to the coast. At Guarema, approximately 60 kms. from São Paulo, it has a flow of 79.6 m³/sec. and drains an area of 5,465 square kms.

At this point however, the State of São Paulo plans to divert 35 m³/sec. for power purposes. If this project were abandoned, this flow could be used as a water supply for São Paulo.

The water would have to be pumped 194 meters, from elevation 570 at Guarema to elevation 764 at a reservoir at Mogí Das Cruces whence it would flow by gravity to a reservoir at the east side of São Paulo. This pumping head could be recovered by generating power at Cubatão after being used by São Paulo and pumped to Billings.

If the entire flow of 79.6 m³/sec. could be utilized, this would resolve the needs of São Paulo to the year 2,000.

CEPA has reported unfavorable on this as a potential source, possibly because of legal and political complications.

4.05.4 The Juquiá River, southwest of the Guarapiranga, has a drainage area of 1,081 km²., and a flow of 16.2 m³/sec. at its mouth. Upstream, part of the flow is used to produce power for an aluminum plant but the available head for power is not high. If the water now used for power were made available to São Paulo, it would eventually reach Cubatão and develop much more power than it does now. This power, in the amount needed by the aluminum plant at Juquiá could be sent over power lines from Cubatão and be a small proportion of that produced.

4.06 Methods of Construction

Construction will be done through approximately 100 contracts awarded by public bidding. Four contracts have already been awarded.

The works are of a large civil engineering type consisting of low and medium height dams, large tunnels in rock, some canals, the installation of large pumps, and a large treatment plant.

Providing adequate soil borings programs are carried out for the adequate preparation of the plans and specifications, no special problems are foreseen.

The pumps, motors, and controls will have to be specially manufactured for this project. Only experienced manufacturers should be admitted to bidding and the manufacturer should supervise the installation, start-up and training of the operators, at least for a year.

4.07 Analysis of Benefits, Tariffs, Charges or Profitability

4.07.1 Present Rates

The present legislation fixes the maximum water rate in relation to the minimum wage in São Paulo, as follows:

<u>Monthly Consumption</u>	<u>Rate</u>	<u>Maximum Rate</u>
Up to 15 m ³ .	NCr\$ 0.10/m ³	.001 x minimum wage
Above 15 m ³ .	NCr\$ 0.15/m ³	.0015 x minimum wage

The minimum monthly bill would then be NCr\$ 1.50. In 1967 this was equivalent to 5.5-days wages for a year supply of water. There was also a flat fee equivalent to US\$ 0.60/month charged for the unmetered connections. Billing is done on a quarterly basis and connection to the system is compulsory.

Typical rates in Brazil for other systems are shown below:

FIG. 19

Typical Rates

	<u>Cost</u> <u>(NCR\$/m3)</u>	<u>Minimum</u> <u>Consumption</u>	<u>Minimum Bill</u> <u>(NCR\$)</u>
São Paulo	0.10	15	1.50
Guanabara	0.073	30	2.19
Recife	0.090	30	2.70
Porto Alegre	0.100	20	2.00
Curitiba	0.080	35	2.80

In addition to these charges, Law No. 9578 of December 30, 1966, permits the collection of a tax called "Contribution to Improvements" which may be applied to the properties located at public areas served by the distribution networks. This tax can be used to finance the extension of the distribution system once the water is available.

The income derived from these rates and other charges for water and sewer covers approximately 78% of the costs of personnel, operation, maintenance and social benefits. The deficit is paid by the State Government by the budget or special funds approved by the State Legislature.

One of the factors adversely affecting the revenue is the antiquated system of billing and collecting which is being brought up to date with a computer system.

Another factor is deficient information concerning the number and location of the consumers. Due to the changes in the street numbering system as well as clandestine connections, there is difficulty in properly addressing the bills which are in many cases sent addressed to "property owner" at the particular address. To remedy this, a survey and census of the users needs to be made and some method of locating the customers must be devised.

By increasing the efficiency of the billing and collecting, a considerable increase in revenue is expected. The actual efficiency of the collection system is being studied by the new administration of DAE.

As previously explained, DAE supplies water to several neighboring municipalities which are then responsible for the distribution. The charges to the municipalities are fixed in their individual agreements with DAE.

The rates are described in the agreements as below:

- ABC Municipalities. a) Costs of operation, maintenance, depreciation of the DAE system.
- b) Amortization and interest of DAE funds invested in APC supplies.
- c) Less amortization of municipal funds used to build supply lines.
- Embú, Osasco and Barueri : Average cost of water for DAE less cost of distribution.
- Mariá : Average cost of water for DAE less costs of chlorination and distribution
- Carapicuíba : 70% of lower rate in São Paulo

4.07.2 Proposed Rates

The new organization COMASP will sell water from the Juquerí System to DAE and the municipalities at a price which will permit the payment of the normal costs of operation, maintenance, depreciation, amortization and interest and a reasonable rate of return on the investment. A detailed study to obtain these costs has not been made but general data of DAE has been evaluated and for the purpose of the analyses, the consultants have estimated this price at NCr\$ 0.07 per cubic meter.

DAE and the municipalities will then be responsible for the distribution of the water and will have to charge a rate sufficient to pay its costs of operation, maintenance, depreciation and amortization and interest on its borrowed capital.

Should the combination of the COMASP charges and the DAE charges require a rate to the consumer that exceeds the maximum rate permissible under the present laws, then the State will have to take measures to obtain the necessary changes in the rate structure.

COMASP and DAE would have to propose a new rate structure for the consideration and approval of the State Legislature. Considering the various changes in rates approved during the past 5 years, no difficulty, other than a time lag, is foreseen in obtaining rate changes.

The operating costs for the Juquerí System have been calculated at NCr\$ 0.027 per cubic meter, which is equivalent to US\$ 3.0 cents per 1,000 gallons.

COMASP will sell the water at an estimated cost of NCr\$ 0.07/m³ or US\$ 10 cents per 1,000 gallons. DAE presently charges its users a minimum of NCr\$ 0.10/m³ or US\$ 14 cents per 1,000 gallons.

For complex systems such as DAE is managing, the price of water is usually nearly US\$ 30 cents per 1,000 gallons so these estimates are considered to be low.

4.08. Operation and Maintenance

Highly trained operators will be required for the treatment plant, electrical installations and the pumping station. Many skilled professionals and tradesmen are available in São Paulo because of the industry that has developed there.

During the construction of the system the key men that will be expected to operate and maintain the system should form a part of the commission charged with supervising the execution of the project. As the equipment is installed, they should receive adequate training in its operation.

COMASP should be so organized that it can pay adequate salaries to attract high level personnel.

The operation and maintenance of the tunnels, canals, dams and access roads require moderately skilled people and no problems are foreseen here.

The administrative aspects that include purchasing and supplies, billing and collecting, and planning are much less than those of DAE.

4.09 Future Expansion

Additional supplies of water will be obtained by building dams and tunnels on the Cachoeira and Jaguarí Rivers to divert another 12 m³/sec. into the Juquerí System.

The tunnels in the system will be built for this future capacity and will be able to handle 22 m³/sec. to the pumping station and the treatment plant. The pumping station will be built to accommodate an additional pump to raise its operating capacity to 22 m³/sec. and the filter plant can also be expanded as needed. The ultimate development of this system will satisfy the needs of Greater São Paulo until 1980.

Beyond this, preliminary studies of other sources with an estimated total capacity of 50 m³/sec. feeding into other systems have been made and a program for this has been prepared. These will take care of the needs of the area until the year 2,000.

4.10

Special Technical ProblemsTunnels and Dams and Major Structures

Additional soil borings and investigations are needed to determine the best location and design for these structures. If the tunnels and pumphouse can be located in solid rock with adequate cover, they will not require extensive lining and the final cost can be reduced. Frequently, by making minor changes in the location, more desirable soil conditions can be obtained, resulting in safer and more economical structures.

Pumps and Electromechanical Equipment

The pumping station will require large equipment. The number and type of pumping units (horizontal or vertical) should be thoroughly analyzed by the consultants to arrive at the best solution. The substation and control equipment will be affected by the design and selection of the pumping equipment and in itself and needs similar attention.

The pumping units will have to be especially manufactured and it is recommended that only manufacturers with previous successful experience in the manufacture of pumps, motors and controls of, at least, this size, be invited to present proposals.

The plans and specifications for this equipment should have the first priority so that it may be purchased at the earliest possible date.

The manufacture and delivery of these pumps may require 18 months.

Sewer System

Additional flows of waste water will reach the streams draining the area, and become available for reprocessing by the industries and the generation of power at the Cubatão hydroelectric plant. It is probable that the final result will be a dilution of the highly concentrated industrial wastes in the streams.

However, there will be a local problem in many of the residential areas not served by sewers. This can be solved momentarily by extending the sewer system but the entire problem should be faced.

As previously mentioned, studies exist for the sewer system of São Paulo and there are no technical problems. But a scheme needs to be devised for financing the sewer system because of its cost - the first stage being estimated at US\$ 400,000,000.

SECTION V - PROJECT EXECUTION

5.01 Proposed Construction Schedule

Additional engineering work to prepare final plans and specifications is required prior to initiating on many phases of the work.

Figure 20, following, shows the program for engineering and construction from the date of the signing of the loan contract. It shows a rather tight schedule for the preliminary and detail engineering work as well as the supply of equipment.

The 36 months time proposed for executing the project is considered to be rather limited because of the effect that geological conditions may have on the tunnel construction and because of long delivery time required for the large pump units and treatment plant equipment. It is believed that additional year should be allowed to complete this project.

5.02 Proposed Schedule of Investments

The State of São Paulo has approved an investment program covering a four-year period. The investments are expected to be heaviest during the second and third years when the heavy construction and equipment purchases will be made.

Figure No. 21 shows the combined investment program.

5.03 Plans and Procedures Proposed for Securing Contracts for Procurement, Construction, Materials and Supplies

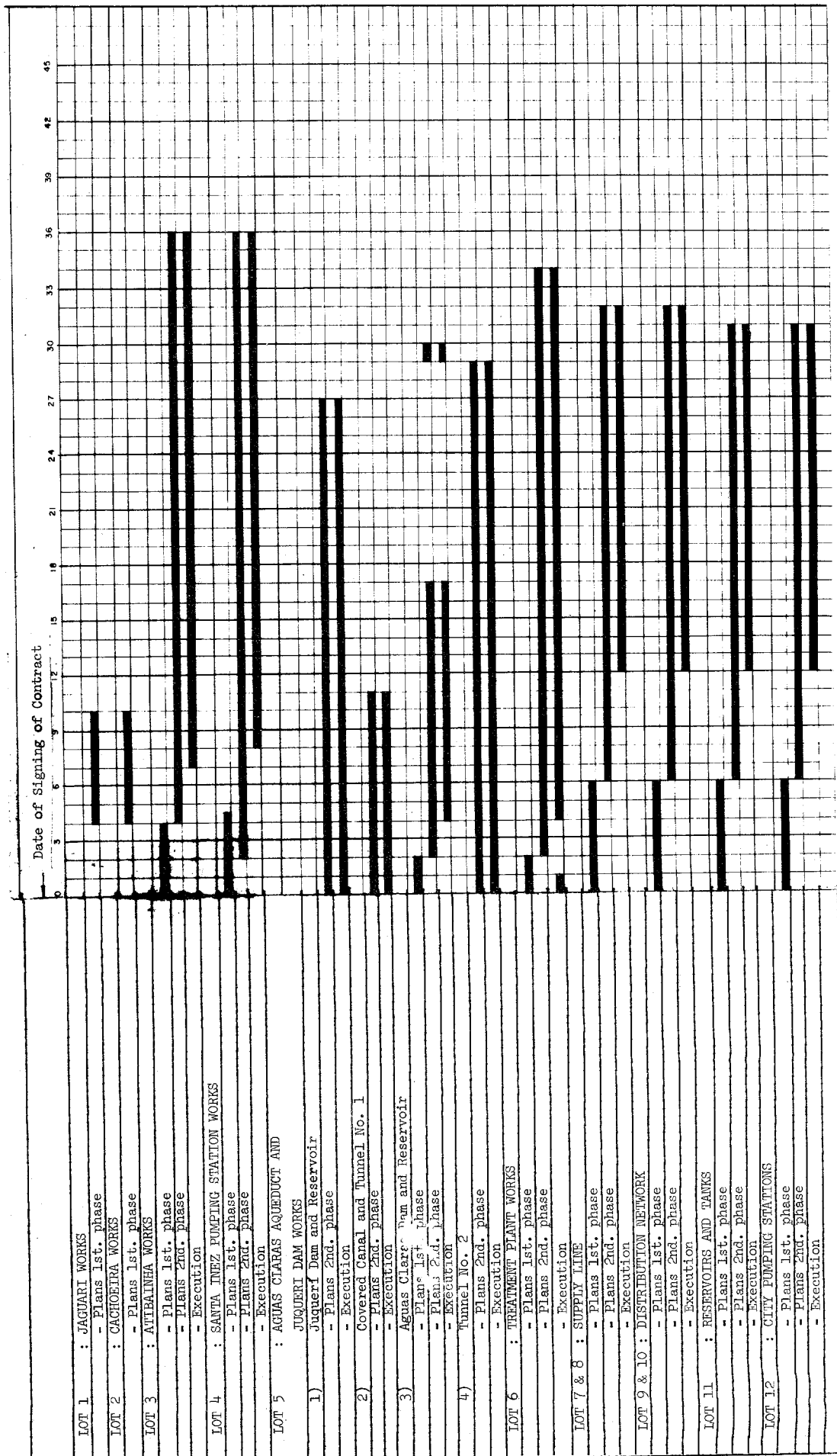
Based on the final plans and specifications, international public biddings will be held for the soil borings and works not yet contracted and the major equipment and materials (pumps, motors, controls, etc.) needed.

Because of the magnitude of the work, the contractors will have to employ large excavating and tunnelling machinery and equipment such as trucks, bulldozers, shovel loaders, back-hoes, draglines, air compressors, drills, concrete pumps, cement plants, tower hoists and mine trains.

The executing agency, for the purpose of controlling the source of supply, might either purchase the equipment from a bid list and furnish it to the contractor or allow the contractor to supply the equipment in accordance with a previously general list in the bid specifications.

Fig. 19

J U Q U E R I S Y S T E M
CONSTRUCTION SCHEDULE - FIRST STAGE



Note: Plans 1st. phase : Preliminary studies, basic project and basic specifications.

Plans 2nd. phase : Specifications, contractual plans, project for execution, supervision and administration of construction.

Execution : Construction, installation and mounting.

FIG. 21

Investment Program

(Expressed in US\$ 1,000)

R S	1		2		3		4		TOTAL		
	I D B	S P (1)	I D B	S P	I D B	S P	I D B	S P	I D B	S P	
ri Dam, Tunnel and educt (2)	360	1,175	1,270	4,150	220	525	-	200	1,850	6,050	
inha Dam and Tunnel	450	950	1,875	7,500	450	3,510	465	-	2,240	11,960	1
ng Station	310	460	750	750	640	440	200	-	1,900	1,650	
ment Plant (2)	300	6,050	185	15,640	363	8,250	60	150	910	30,090	3
y Mains, Accessories Controls	825	50	1,605	3,290	2,475	2,235	470	390	5,375	5,965	1
eeing	500	200	500	700	500	400	150	50	1,650	1,350	
vision (COMASP)	-	250	-	300	-	300	-	150	-	1,000	
istration	-	1,680	-	1,680	-	1,965	-	200	-	5,525	
el Studies	-	300	-	840	-	250	-	-	-	1,390	
ical Assistance	175	125	175	125	175	85	175	85	500	420	
nspection and Control	75	-	75	-	75	-	75	-	300	-	
est During Construction	130	10	430	25	750	40	465	25	1,775	100	
T O T A L	3,125	11,250	5,865	35,000	5,550	18,000	1,960	1,250	16,500	65,500	8
	14,375		40,865		23,550		3,210		82,000		

S P . State of São Paulo, local contributions.

The existing contract is for site preparation only, IDB funds are for equipment and indirect imports.

The longest delivery times will be required for the pumps, motors and treatment plant equipment.

5.04

Technical Assistance

5.04.1 Administration and Management

In order that COMASP and its chief customer DAE may function efficiently, the services of a consulting firm in management should be obtained to assist in developing and improving them. The firm will make a complete study and evaluation of the administration and organization of DAE, taking into account the salaries, number and quality of personnel, functions and responsibilities, system of work, and prepare a plan for the reorganization of DAE. The consultants should prepare an initial report outlining the major problems and the general scheme proposed to improve DAE for review and discussion with DAE and the IDB.

Following this report, the consultants will make a detailed study of DAE to determine the most appropriate organization and system of administration in accordance with the scheme developed in the initial report. After review and discussion with DAE and IDB, the consultants will prepare a final program with recommendations and a timetable for reorganization and participate in the implementation. Simultaneously, the consultants will review the legislation pertaining to COMASP and similar institutions, study the objectives and functions of COMASP and in collaboration with the State authorities, prepare an initial, interim, and final report for the organization and establishment of COMASP. The consulting service will also include the implementation and evaluation over the period of the loan. These services will be contracted by COMASP and DAE at an estimated cost equivalent to US\$300,000 and will be paid from loan funds.

5.04.2 Water Loss Survey

A specialist consulting firm should be hired by DAE to make a study to determine the water losses in the system and to obtain the basic information needed to improve the distribution system and to make the rate study. By locating and reducing the losses, the present supply of water will be able to serve more people.

The consultants should provide the key men and DAE the staff personnel to assist in daily work so that these men will be trained and form a special group for continuing the work. These will be financed with loan funds and are estimated to cost US\$ 200,000.

5.05 Parallel Studies by DAE

5.05.1 User Survey

A cadastral and user survey must be made of area served by the present water system to obtain information concerning the actual number of connections to the system, the type of connections, and the number, type and location of the dwellings.

Previous surveys in other cities in Brazil such as Rio de Janeiro and Salvador, Bahia, have shown that there is a considerable percentage of unregistered connections which consequently are not billed. In Copacabana, a well-to-do zone of Rio de Janeiro, for example, it was discovered that the number of such connections was approximately 10%.

There are several firms in Brazil that have successfully done such work by means of a combination of aerial photographs and house-to-house interviewers.

DAE will contract these studies with a qualified experienced firm and paid from the local contribution. This data will be obtained according to the criteria established by DAE to make the rate studies.

5.05.2 Rate Studies.

As the cadastral and user survey is being completed, data as to operating costs and consumption will be available for devising the new rate structures for each of the municipalities and the area served by DAE.

The staff of DAE has highly qualified people capable of making the necessary rate studies, some of whom have on occasion been hired by international agencies as consultants.

The rate structure should take into consideration the costs of production, the socio-economic level of the people, and the volume consumed.

The costs of the rate studies should be paid as part of the local contribution.

5.06 Control of Execution by the Executing Agency

The hiring of consulting firms will follow the procedures of Act No. 3894 of August 17, 1967, of the Secretary of Public Works and Services which is similar to the accepted IDB procedures.

A principal consulting firm will be hired and will coordinate the services of other consulting firms for specialized parts of the project.

The principal firm will be responsible for the overall planning, programming and control of the project.

The specialized firms will prepare the basic plans for the parts of the project assigned to them. After review and approval by COMASP and IDB, the firms will proceed to make the final plans and specifications for the contracts.

The consultants will assist in the letting and award of bids, the inspection of materials, the acquisition of equipment and materials, and other services needed to begin construction.

The consultants will be responsible for construction and materials standards, construction drawings, specifications for goods and services, cost estimates, disbursement schedules, programming, change orders, reports on physical and financial progress, reception of works, materials, and services, reports on equipment and materials inspection, certification of work and payment, recommendation for payment, as-built drawings, and operation and maintenance manuals.

The borrower is proposing to use services of major Brazilian firms and selected foreign firms and consultants. He is also planning to utilize specialized consultants from abroad as needed. In some cases, these men will be made available through joint venture agreements with foreign firms or by direct hire.

Both long-term and short-term consultants will be needed in project management, programming specifications, soil mechanics, geology, hydraulics, large pump and electric motor selection, high voltage equipment selection and rock tunneling.

The engineering and design has been estimated at US\$3,000,000. The costs for the foreign specialists and consultants are shown below and have been estimated at US\$ 1,650,000, of which the equivalent of US\$ 500,000 will be in local currency.

Senior Engineering Services

1. Salary	18,000
2. Allowances 300 x 12 x 4	14,400 (")
3. Social Benefits, Insurance(26%)	4,600
4. Travel and Household Effects	10,400
5. Company Overhead (70% salary)	12,600
	<hr/>
	60,000/man-year

6 engineers for 21 man-years	1,280,000
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Review Board

4 engineers 2 mos/year for 4 years at \$ 225 per day	240,000
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Contingencies

Approximately 10%	130,000 (')
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T O T A L	<u>US\$ 1,650,000 (')</u>
-----------	---------------------------

(') The allowances and part of the contingencies can be paid in local currency and will be equivalent to US\$ 500,000.

The cost for the services of the local firms has been estimated at US\$ 1,350,000 and being in local currency will be paid by the borrower.

The same firms will carry out the supervisory services for COMASP, the executing agency. The cost of these services have been estimated by the borrower at US\$ 1,000,000 and will be paid from the local contribution. The total for all these services is estimated at US\$ 4,000,000. This is equivalent to approximately 6% of the construction cost and is considered reasonable.

5.07 Proposed Inspection and Supervision of Execution by the Bank

The IDB will carry out its inspection and supervision by means of a team of highly qualified specialists to be hired by the Bank and from outside the country.

The team will consist of an engineer and a financial expert. The engineer must have had experience in the management of projects of similar magnitude that include dams, tunnels, high voltage lines, large pumping or hydro-electric installations and major hydraulic structures. His functions will include the technical and administrative control of the project and general supervision.

The financial expert should have had experience in the direct financial control of foreign construction projects exceeding US\$ 50,000,000 in value and be a certified public accountant.

When special matters so require, this team will be complemented by short-term consultants in fields such as hydrology, geology, and large electro-mechanical equipment.

It is estimated that the cost of these services will be US\$ 300,000 provided that COMASP makes office space, transportation to the work sites and other facilities available to the team.

The detail of costs for the team and the terms of reference are shown at the end of the report (Appendices 4, 5 and 6).

5.08 Schedule of Financial Requirements for the Project

Because of the present deficit, the entire production of the project -- 311×10^6 m³ -- will be consumed when the system is put into operation. COMASP will sell the water to DAE and the municipalities at an average bulk rate of NCr\$ 0.07/m³.

For COMASP the depreciation has been based on an average life of 50 years and the operating cost by the consultants at NCr\$ 0.027/m³, which are considered reasonable.

In 1966, the combined operating costs for the water and sewer systems of DAE was US\$ 12,295,000. It is estimated that 66% of this or US\$ 8,195,000 was for the water system. During this period, DAE produced and distributed 343.3×10^6 m³ of water.

For COMASP, the cost of operation and maintenance has been estimated at US\$ 0.01/m³ and the bulk sale price at US\$ 0.0259/m³.

For DAE, the cost of operation and maintenance is taken as US\$ 0.0238/m³ for 343×10^6 m³. (including production and distribution) and US\$ 0.0138/m³ for the 311×10^6 m³ produced by the Juquerí System. It is assumed that 20% of the water entering the DAE distribution network will be unaccounted for because of leakage, unmetered usage, or other reasons.

FIG. 22

COSTS AND REVENUE FOR JUQUERI PROJECT

Year	C O M A S P				D A E			
	Million m3/year	Depreciation	O & M	Revenue	Million m3/year	Depreciation	O & M	Revenue
1	-	-	-	-	343.3	1,693	8,195	12,295
2	-	1,640	1,555	-	343.3	1,704	10,450	12,295
3	150	1,640	3,110	4,032	493.3	1,715	12,486	16,249
4	311	1,640	3,172	8,064	654.0	1,800	12,735	21,929
5	311	1,640	3,236	8,064	654.0	1,885	12,990	21,929
6	311	1,640	3,300	8,064	654.0	1,971	13,250	21,929
7	311	1,640	3,366	8,064	654.0	2,056	13,515	21,929
8	311	1,640	3,433	8,064	654.0	2,141	13,785	21,929
9	311	1,640	3,501	8,064	654.0	2,226	14,060	21,929
10	311	1,640	3,571	8,064	654.0	2,311	14,342	21,929

COMPARATIVE CHARACTERISTICS FOR SELECTED LARGE PUMPS

N A M E	B R A S I L 3 in 1966			U N I T E D S T A T E S 12 in 1964								E U R O P E 34 in 1964								
	S A O P A U L O	V I G A R I O	S A N T A C R E C I L I A	E L E V. D O I A - M E T R A O	E A G L E M T.	H T W A S - S E E	T R A C Y C A L I F.	T A I M S A U K	G R A N D C O U L E E	T E H A - C H A P I	D E L T A	L I N E R S E E	F F E S - T I N I O G	C R U A - C H A N	V I A N - D E N	T E R - D E C I E	A R R O L L I A	Z I M M U T	S A N T I A - G O D E J A R E S	V I L L A - R I N O
Head M	125	36	16	117	134	62.5	60.0	247	94.0	594.0	76.0	960	305	358	268	214	310	470	241	104
Stages	1	1	1	1	1	1	1	1	1	4	1	5	2	1	2	1	2	2	1	1
Head/Stage M	125	135	16	117	134.0	62.5	60.0	247.0	94.0	148	76.0	192	152	358	134	214	155	235	241	404
Number of Units	2 + 1	4	4	2 3	4+2+3	1	6	2	6	16	2 5	5	4	2	9	3	2 + 2	2 + 2	2	2
Unit Flow m ³ /sec.	11.0	40	40	247 4.6	5.6 6.0 9.3	110	24.0	69.0	36.7	9.1	10.0 30.0	44.1	20.8	28.6	22.6	2.7	4.0	3.4 3.2	9.0	29.0
Unit H P	20,000	22,500	9,500	4,500 8,000	11,300 12,200 12,650	100,000	21,300	250,000	51,000	80,000	11,250 34,500	58,000	94,000	142,000	89,000	8,700	19,000	37,200 17,000	32,000	174,000
Speed (RPM)	514		166.7	600 400	450	105.9	180	200	200	600	400 225	750	428	500	428	1,500	1,500	1,500	500	600
Efficiency (%) G = Guarantee	90			88 88		90	89.3		93.9	90.2	90.7 90.7	89.5 88.7	90.6		91.0	90.4	88.0			
Initial Operation		1952	1952	1965	1939	1956	1951	1963	1951	1970	1968 1968	1977/8	1961	1966	2-1962 4-1963 3-1964	1964	1963	1967	1968	1968
Total Hours Operation					100,000 25,000 30,000	45	35,000		20,000			13,500	3,200			1,600	1,900			
Specific Speed (m ³ /s; m; rpm)	58				38	67	55	36	55	56		39	43	58	44	61	66	56	30	54
Suction Sp. Speed (m ³ /s; m; rpm)					194	230	200	244	122			151	176		151	141	109	141		
Positive Suction Head Min.	9.2			5.4 5.4		0.9	0.3	9.2	2.1		0.9 0.9	21.0	13.1		12.8	38.2	65.0	30.0		

*/ Estimated

GENERAL LIST OF GOODS AND SERVICES
(in US\$ 1,000) (1)

	I D B		SAO PAULO	Total
	<u>Foreign</u>	<u>Local</u>	<u>Local</u>	
Atibainha Source	2,240	-	11,960	14,200
Juquerí Source and Aqueduct	-	1,850	6,050	7,900
Santa Inez Pumping Station	1,900	-	1,650	3,550
Treatment Plant	910	-	30,090	31,000
Main Supply Lines	3,500	1,875	5,965	10,340
Engineering and Design	1,150	500	1,350	3,000
Supervision (COMASP)	-	-	1,000	1,000
Administration	-	-	5,525	5,525
Complementary Studies	-	-	1,390	1,390
Technical Assistance	500	-	420	920
IDB Inspection and Control	300	-	-	300
Interest During Construction	1,775	-	100	1,875
	12,275	4,225	65,500	82,000

(1) First 8 items include 10% for contingencies.

DIRECT FOREIGN COSTS (')

	<u>Construction Equipment</u>	<u>Fixed Equipment</u>	<u>Others</u>	<u>Total</u>
<u>Atibainha Intake Works</u>				
Dams	1,800	-	-	1,800
Tunnel	440	-	-	440
Santa Inez Pumping Station	400	1,500	-	1,900
Guaraú Treatment Plant	160	750	-	910
Main Supply Lines	1,350	2,150 (')	-	3,500
Engineering Services	-	-	1,150	1,150
Technical Assistance	-	-	500	500
IDB Inspection and Control	-	-	300	300
 T O T A L	 4,150	 4,400	 1,950	 10,500

(') The table shows direct foreign costs. Indirect foreign costs have been estimated at US\$ 5.8 and comprise expenditures for fuels and lubricants, depreciation of equipment, paving materials, materials included in locally manufactured items, as shown below:

Depreciation of construction equipment used for Juquerí dam and tunnels	US\$ 1,850,000
Cost of imported materials used for the domestic manufacture of steel plate and asphalt	3,100,000
Cost of imported materials for fuels and lubricants	850,000
	<hr/> US\$ 5,800,000

(') This includes the special valves, meters, controls and operating instruments.

TERMINOS DE REFERENCIA PARA
EL ESPECIALISTA DE PROYECTO

(Ingeniero)

A : _____, Especialista
de Proyecto del BID en Brasil

DE : _____, Director
División de Análisis de Proyectos Sociales

ASUNTO : Términos de Referencia para el Desempeño de su Misión

PRA/SD- _____
FECHA: _____

Como Especialista de Proyecto para los préstamos _____
ante el prestatario, Estado de São Paulo, usted deberá desempeñar sus funciones ateniéndose a los siguientes términos de referencia:

1. Su sede será la ciudad de São Paulo, y desplegará sus actividades en aquellas áreas del país de residencia en las cuales se ejecuten las obras con los préstamos a su cargo.
2. En todos los asuntos técnicos relacionados con el Banco, su canal de enlace será esta Dirección, a la cual deberá rendir sus informes, por intermedio de la Representación, en cuya oficina el Ingeniero Residente será el encargado de vigilar y coordinar el cumplimiento de estas labores. Dependerá jerárquicamente del Representante Regional a quien deberá mantener informado de sus actividades, prestándole en todo momento la más estrecha colaboración, de acuerdo a lo establecido en la Orden Administrativa 601.
3. Actuará como Especialista de Proyecto ante el prestatario, Estado de São Paulo, COMASP y las empresas distribuidoras. Sin embargo, es posible que en el futuro se le asignen similares obligaciones ante otros prestatarios, de acuerdo con las conveniencias del Banco.
4. Actuará en funciones de carácter técnico relacionadas con otras operaciones, únicamente en los casos específicos en que esta Dirección lo estime conveniente y así lo indique a usted por escrito.
5. Informará de sus actividades de acuerdo con las instrucciones específicas que se adjuntan y de aquellas que usted reciba de PRA en el futuro.
6. Gestionará el oportuno envío de los informes trimestrales que los prestatarios deben presentar, de acuerdo con los requerimientos de la Subgerencia de Administración de Préstamos (LAD). Además, luego de haber recibido las copias correspondientes de dichos informes, deberá enviar a la Sede sus comentarios sobre los mismos, con las recomendaciones del caso.

I-50

7. Informará y comentará a esta Dirección y al Area V de la División C de Administración de Préstamos, sobre cualquier cambio que se proponga en las listas de Bienes y Servicios, o cualquier modificación de carácter técnico relacionado con los proyectos iniciales.
8. Para el desempeño de sus funciones, esta Dirección delega en usted las siguientes atribuciones:
 - a. Aprobar, a nombre del Banco, los planos y especificaciones de ingeniería de las obras que se ejecuten en los proyectos financiados con los préstamos del BID bajo su vigilancia.
 - b. Aprobar los llamados y condiciones generales de las licitaciones, cumpliendo con lo estipulado en los Contratos de Préstamo y las instrucciones que reciba.
 - c. Supervisar los proyectos financiados con los préstamos a su cargo, realizando visitas de inspección periódicas a todos los sitios donde se ejecuten obras, de acuerdo a la Circular a los Representantes enviada el 10 de enero de 1968, conjuntamente firmada por los Sub-Gerentes de PRA y IAD y a las instrucciones que sobre esta materia se le enviarán próximamente.
 - d. Ratificar las adjudicaciones que se hicieron para la adquisición de bienes y servicios y la ejecución de obras; en los casos de adjudicación de bienes y/o servicios procedentes de países miembros del Banco distintos de Brasil o de los Estados Unidos, que sean financiados bajo el Fondo Fiduciario o el nuevo Fondo Especial, y que excedan de US\$ 20,000. deberá remitir a esta Dirección la información pertinente, junto con sus recomendaciones. Después de examinar esta documentación, esta Dirección le comunicará su decisión al respecto.
 - e. Aprobar los contratos correspondientes a las licitaciones cuyas adjudicaciones hayan sido aceptadas.
 - f. Evacuar las consultas de carácter técnico que se presenten en relación con los proyectos en ejecución y bajo su responsabilidad.
 - g. Certificar, a pedido de la Sub-Gerencia de Administración de Préstamos, y previo a la presentación de las solicitudes de desembolso, la correcta inversión de los fondos, de acuerdo con lo establecido en los Contratos de Préstamo.
9. Deberá enviar copias de las comunicaciones que se dirijan a los prestatarios, en cumplimiento de estas funciones, tanto a esta Dirección como al correspondiente Jefe de Area de IAD.

10. Prestará asesoramiento a los prestatarios en la medida de su capacidad y experiencia, para lo cual colaborará con ellos en todo lo que contribuya a facilitar la rápida y adecuada ejecución de los proyectos y en la adopción de sistemas y procedimientos apropiados para el empleo y recuperación de los recursos del Proyecto, en especial, los provenientes de los fondos del Préstamo.
11. Para todos los aspectos del proyecto, deberá actuar coordinadamente con el especialista de proyecto en asuntos financieros contables.

TERMINOS DE REFERENCIA PARA EL ESPECIALISTA DEL PROYECTO
(FINANCIERO-CONTABLE)

Apéndice 5
I-52

PRA/

FECHA:

A: Especialista
de Proyecto del BID en Brasil

DE: Director
División de Análisis Financiero e Institucional

ASUNTO: Términos de Referencia para el Desempeño de su Misión.

Como Especialista de Proyecto para los préstamos de agua potable ante el prestatario, el Estado de Sao Paulo, usted deberá desempeñar sus funciones ateniéndose a los siguientes términos de referencia:

1. Su sede será la ciudad de São Paulo y desplegará sus actividades en aquellas áreas del país de residencia en las cuales se ejecuten las obras con los préstamos a su cargo.
2. En todos los asuntos financiero/contables relacionados con el Banco, su canal de enlace será esta Dirección, a la cual deberá rendir sus informes, por intermedio de la Representación, en cuya oficina el Ingeniero Residente será el encargado de vigilar y coordinar el cumplimiento de estas labores. Dependerá jerárquicamente del Representante Regional a quien deberá mantener informado de sus actividades, préstandole en todo momento la más estrecha colaboración, de acuerdo a lo establecido en la Orden Administrativo 601.
3. Actuará como Especialista de Proyecto ante el prestatario, el Estado de São Paulo, COMASP y las empresas distribuidoras, Sin embargo, es posible que en el futuro se le asignen similares obligaciones ante otros prestatarios, de acuerdo con las conveniencias del Banco.
4. Actuará en funciones de carácter técnico relacionadas con otras operaciones, únicamente en los casos específicos en que esta Dirección lo estime conveniente y así lo indique a Ud. por escrito.
5. Informará de sus actividades de acuerdo con las instrucciones específicas que se adjuntan y de aquellas que Ud. reciba de PRA en el futuro.
6. Supervisará la oportuna elaboración en la parte financiera y envío de los informes trimestrales que los prestatarios deben presentar, de acuerdo con los requerimientos de la Subgerencia de Administración de Préstamos (IAD). Además, luego de haber recibido las copias correspondientes de dichos informes, deberá enviar a la Sede sus comentarios sobre los mismos, con las recomendaciones del caso.

7. En el desempeño de esas funciones deberá usted realizar todas las tareas inherentes al contralor financiero-contable del proyecto y específicamente las siguientes:
 - a. Informar sobre los progresos realizados por la firma consultora sobre la organización de COMASP y la reorganización de DAE.
 - b. Controlar la debida registración en cuentas separadas tanto de las inversiones del programa como de los fondos BID y aportes locales.
 - c. Atender a que se cumplan las cláusulas de carácter financiero del contrato de préstamo.
 - d. Atender al envío oportuno de los documentos de índole financiera a que quedan obligados a enviar por el contrato de préstamos DAE y COMASP. A tales efectos controlará que la información remitida esté de acuerdo con las normas del BID en materia de dictamen.
 - e. Actuar en el plano financiero efectuando funciones de control y asesoramiento relativo a estados de gastos, estados de inversiones, estados de fondos de préstamo, manejo del fondo rotatorio, solicitudes de desembolsos, etc.
 - f. Actuar conjuntamente con el especialista de proyecto en materia de ingeniería en lo relativo a todo lo concerniente a las listas de bienes y servicios y posibles modificaciones, y a la adjudicación que le hicieran para la adquisición de bienes y servicios y la ejecución de obras, en lo pertinente.
 - g. Efectuar todas aquellas funciones en el plano financiero contable que a su juicio ayuden en el desarrollo normal del proyecto.
8. Deberá enviar copias de las comunicaciones que se dirigen a los prestatarios, en cumplimiento de estas funciones, tanto a esta Dirección, como al correspondiente Jefe de Area de LAD.
9. Prestará asesoramiento a los prestatarios, COMASP y las empresas distribuidoras en la medida de su capacidad y experiencia, para lo cual colaborará con ellos en todo lo que contribuya a facilitar la rápida y adecuada ejecución de los proyectos y en la adopción de sistemas y procedimientos apropiados para el empleo y recuperación de los recursos del proyecto, en especial, los provenientes de los fondos del préstamo.
10. Deberá actuar coordinadamente con el Especialista del Proyecto en asuntos técnicos para todos los aspectos del proyecto.

IDB SUPERVISION AND CONTROL

1. Salaries

Specialist engineer	15,000x4 =	60,000	
Specialist finance	12,600x4 =	50,400	
		<u>110,400</u>	110,400

2. Allowances

Medical insurance	110x4 =	440	
Health & accident insurance	60x4 =	240	
Installation		900	
Post	350x48 =	16,800	
		<u>18,380x2</u>	36,760

3. Travel

Family	5,000x2 =	10,000	
Household effects		3,000	
Local (São Paulo-Rio de Janeiro)		400	
		<u>13,400x2</u>	26,800

4. Contractual Services (Brazil)

Assistant (engineer-account.)	7,000x3-1/2 =	24,500	
Secretary	3,600x4 =	14,400	
Chauffeur	2,400x4 =	9,600	
		<u>48,500</u>	
Social Benefits (80%)		38,800	
		<u>87,300</u>	87,300 1/

5. Administration

Office, utilities, travel (COMASP)		--	
Furniture and equipment		4,000	
Supplies		4,000	
Communications		2,000	
Jeep		3,000	
Fuels, lubricants, maintenance	100x48 =	4,800	
Insurance, etc.	300x4 =	1,200	
		<u>19,000</u>	19,000

6. Contingencies

	<u>19,740</u>
US\$	<u>300,000</u>

1/ The local staff will be established in accordance with the needs and development of the project, and part of the funds in the category can be utilized for contingencies such as special consultants.

VI .- ANALISIS FINANCIERO6.01 Enfoque del Estudio

El informe financiero que sigue se ha enfocado de manera de estudiar sucesivamente tres grandes grupos de problemas:

- 1) Aspectos relacionados con la organización del conjunto operativo.
- 2) Investigación financiera de las entidades intervinientes.
- 3) Análisis financiero del proyecto.

Dentro de cada uno de estos grupos se analizarán, en los pertinentes, tres niveles:

- a) El nivel del prestatario, es decir el Estado de São Paulo.
- b) El nivel del organismo ejecutor, es decir la COMASP (Companhia Metropolitana de Agua de São Paulo).
- c) El nivel de las empresas distribuidoras, de cuya buena marcha en el plano financiero, depende la consecución exitosa del proyecto.

En este nivel se analizará solamente DAE, empresa que en los primeros años del proyecto prácticamente hará el 100% de la distribución.

6.02 Análisis de los Aspectos Organizativos del Conjunto Operativo

En el análisis de los aspectos de organización del complejo operativo, lógicamente se ha centrado el enfoque en los dos niveles donde se han de reflejar los desarrollos funcionales del proyecto, es decir el de la COMASP y el de las empresas distribuidoras, así como en el problema de relaciones operacionales y de comunicaciones entre ambos niveles.

6.02.1 La COMASP1. Origen

La COMASP, entidad que se acaba de crear por disposición legal No. 10.058 del Gobierno del Estado de São Paulo de fecha 7 de febrero de 1968, tiene por finalidad la producción de agua potable destinada al abastecimiento público de las ciudades incluidas en el área del Gran São Paulo.

El 11 de Marzo de 1968 se han transferido las obras del sistema Juqueri-Capivari-Monos y afluentes^{1/} y quedan

^{1/} A marzo de 1968, ya se ha transferido parte de dichos bienes. Véase el Balance de Apertura de COMASP.

por transferirse los demás sistemas de producción actualmente a cargo del DAE (Departamento de Aguas e Esgotos).

2. Capital

La forma legal de la COMASP, según el Art. 1ro. de la ley mencionada será la de una sociedad por acciones.

El capital accionario inicial, ha sido fijado en NCR 100.000.000 (US\$ 31.250.000).

Además de dicho capital inicial el art. 12 de la ley del 7 de febrero de 1968, autoriza al Poder Ejecutivo a suscribir NCR 200.000.000 adicionales en acciones de COMASP, hasta el 31 de diciembre de 1970.

Se ha establecido específicamente que el Estado, a través del Departamento de Aguas e Energía Eléctrica y/o del Departamento de Aguas e Esgotos ha de tener mayoría en las acciones con derecho a voto. El resto del capital accionario podrá estar en poder de municipios o empresas municipales y de personas o entidades privadas.

La integración del capital inicial se hará en efectivo por parte de DAEE (Departamento de Aguas e Energía Eléctrica) y en bienes por parte de DAE (Departamento de Aguas e Esgotos).

Las integraciones en especie, por parte de DAE, según ley, se constituirán por:

- 1) Inversiones en estudios relativos al aprovechamiento de los ríos Juquerí-Capivari-Monos y afluentes.
- 2) Los bienes aplicados a ese fin.
- 3) Otras obras y equipos ya existentes y necesarios a los objetivos de la empresa.

Aún no se ha evaluado el monto de los aportes de los bienes comprendidos en el punto 3).

3. Organización

La Dirección de la COMASP estará en manos de un Consejo de Administración compuesto en un 50% por directores emanados de la Asamblea General de Accionistas y en un 50% del Gobierno del Estado, Secretaría de Obras Públicas, DAE, DAEE, Municipios y otros. (Véase Organograma en Apéndice 7).

La organización básica que se piensa dar a la entidad, según los estudios preliminares realizados hasta el presente, es la siguiente:

I. Organos Obligatorios Según Ley de Sociedades Anónimas

a. Asamblea General de Accionistas.

b. Consejo Fiscal.

Estos dos órganos ejercerán respectivamente la orientación y fiscalización general, contable y financiera de la empresa.

II. Consejo de Administración

Estará compuesto por los cinco directores de la empresa y cuatro representantes de los accionistas. Este Consejo tendrá la función básica y específica de estudiar y aprobar la planificación general de trabajo y expansión de la empresa. A este Consejo competirá resolver todos los problemas relacionados con la capacidad de producción y de ventas. Ha de funcionar como elemento coordinador en los asuntos relacionados con la expansión de los sistemas de producción y distribución, planes de ampliación, financiaciones y otros asuntos necesarios para el desarrollo de la empresa.

III. Directorio Ejecutivo

Estará formado por cinco directores que serán responsables de:

Presidencia
Departamento Administrativo
Departamento Comercial
Departamento de Operaciones
Departamento Técnico

Cada Departamento será dirigido por un Director, miembro del Directorio.

En el Organigrama primario que se adjunta (Apéndice 8) se detallan las funciones que han de corresponder a los distintos departamentos.

Debe tenerse en cuenta sin embargo, que muy posiblemente ese organigrama ha de ser modificado a la luz de los estudios de base que necesariamente se han de hacer para establecer la estructura operativa definitiva de la entidad para sus primeros años de desarrollo.

6.02.2 Análisis de DAE1. Objetivos

El actual DAE se formó en el año 1954, en que la Repartición de Aguas y Esgotos de São Paulo, que databa de 1892, tomó forma de organismo autárquico. (Ley No.2627 del 20 de enero de 1954). Su acción se extiende al municipio de São Paulo y a los de Guarulhos, São Cãetano do Sul, Santo André, y São Bernardo de Campo.

Le compete proyectar, ejecutar, ampliar, remodelar y explotar directamente los servicios de agua potable y alcantarillados sanitarios, dotando de esas facilidades a todos los núcleos de más de mil habitantes. Es decir que además de las funciones relativas a los alcantarillados sanitarios tiene las de producción y distribución de agua. DAE produce agua y la vende al por mayor a distintas municipalidades del Estado, para que estas las vendan al por menor. Además atiende la venta al por menor de agua en la ciudad de São Paulo.

Sus ingresos fundamentales son derivados de operación (tarifas de consumo y conexiones de agua, instalaciones de medidores, conexiones por alcantarillado y multas) y las sumas que recibe del Estado de São Paulo como contribución para financiar gastos de operación y gastos de capital.

2. Estructura

Según el decreto No.34640 del 30 de enero de 1959, el DAE es dirigido y administrado por un Director General.

Está constituido por los siguientes órganos:

I. Organos de naturaleza consultiva.

- a. Consejo Estadual de Aguas y Alcantarillados.
- b. Comisión de cuentas.

II. Organos de administración.

- a. Dirección General.
- b. Divisiones, servicios y comisiones.
 - b.1 Divisiones:

Instalaciones en predios

Servicios auxiliares (oficinas y transportes)
Materiales
Personal
Contabilidad y Presupuesto
Hacienda
Planeamiento y Obras
Agua
Alcantarillado
Tratamiento

b.2 Servicios:

Obras de Agua
Obras de Alcantarillado
Obras de remitentes
Obras del ABC

b.3 Comisión especial de obras nuevas.

c. Procuraduría Judicial

La relación entre dichos órganos la mostramos en el Apéndice 9 donde obra un organigrama de la entidad. Debe tenerse en cuenta en el estudio de dicha estructura que:

1. Tienen carácter provisorio los siguientes sectores, cuya organización definitiva está pendiente de estudio:
 - a. Servicio de obras de agua
 - b. Servicio de obras de alcantarillado (red)
 - c. Servicio de obras de remitentes.
 - d. Servicio de las obras del ABC.
2. La División de Finanzas tiene existencia de hecho pero no ha sido específicamente establecida por disposiciones legales.
3. La ley prevee la incorporación de los servicios indicados en 1) y de la División de Planeamiento y Obras.

Un análisis del mencionado organigrama no indica desviaciones esenciales de las normas generalmente aceptadas en materia de organización.

Sin embargo, llama la atención el gran número de las divisiones atendidas por la Dirección General, lo que muy posiblemente puede conspirar contra un más efectivo desempeño de sus funciones.

Falta en el organigrama además la sección encargada de realizar la auditoría interna del organismo, esencial en una institución del carácter de la que analizamos.

Hemos estudiado en detalle los sectores de la organización correspondiente a la División de Finanzas y de la División de Contabilidad.

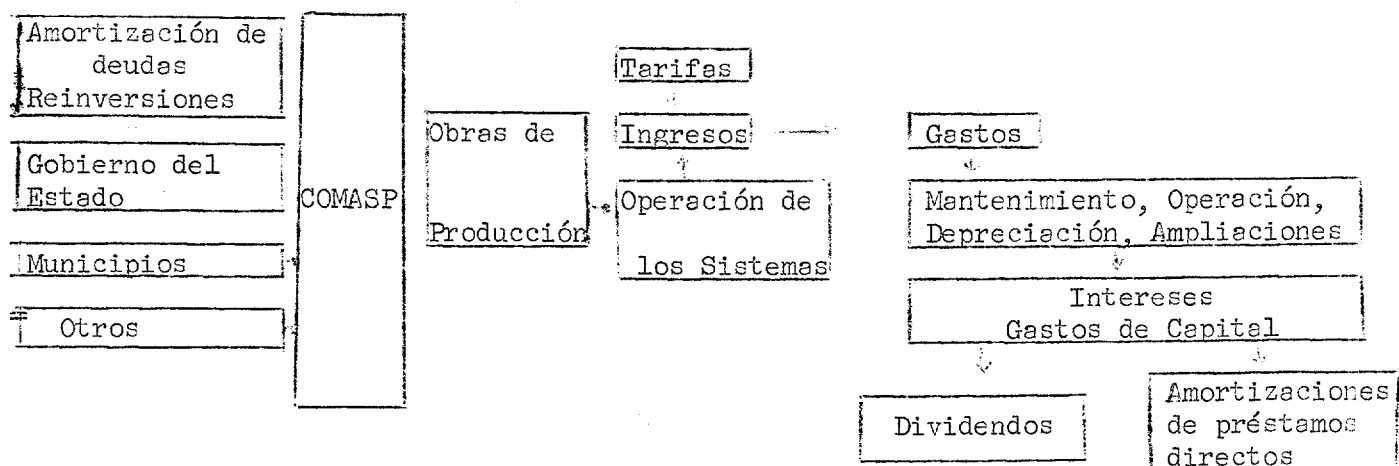
Del análisis de dicha estructura organizativa, del personal que la atiende y de los procedimientos contables que utiliza, quedó en claro lo siguiente:

1. Insuficiencia numérica de personal de preparación adecuada en los cuadros superiores financiero-contables.
2. Procedimientos contables que no posibilitan el conocimiento de la condición financiero-patrimonial de la entidad.
3. Falta de adecuada racionalización de la secuencia operativa en esta área de actividades.

6.02.3 Relaciones Funcionales Entre los Tres Niveles

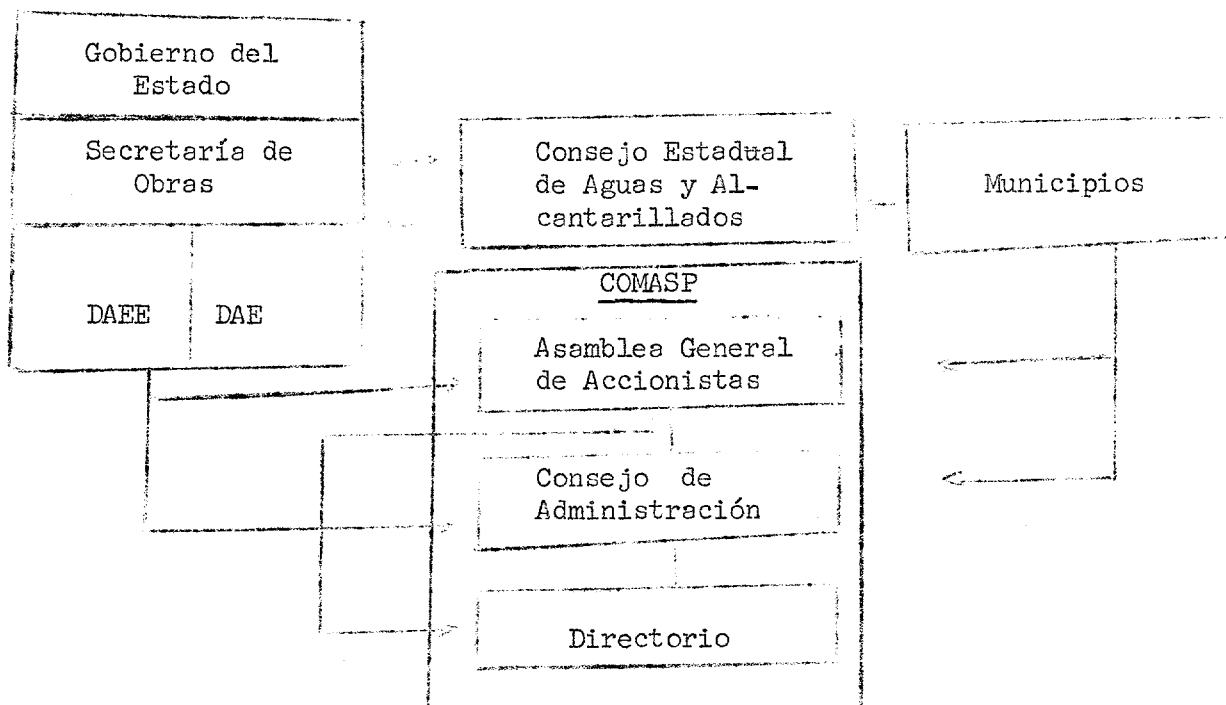
1. Relaciones Entre el Estado de São Paulo y el COMASP

- a. Las relaciones funcionales entre ambos niveles se ha de establecer fundamentalmente a través de los representantes del Estado en el directorio de COMASP.
- b. Las relaciones financieras se han de concretar a través de:
 1. Partidas para capitalizar al organismo y que han de obrar en el Presupuesto del Estado. Este aspecto se estudia en particular al analizar financieramente el proyecto.
 2. Transferencias de los recursos del préstamo del Estado a la COMASP. El mecanismo a operar aún no se conoce específicamente.
 3. Política de dividendos de la COMASP. Se hace recomendación específica al respecto.
 4. Política del Estado de São Paulo en cuanto a reinversión o no de dividendos recibidos. Este punto se considera en las recomendaciones.
- c. El circuito financiero en que ha de actuar el sistema es el siguiente:

CIRCUITO FINANCIERO

2. Relaciones entre el COMASP y las Entidades Distribuidoras.

Las relaciones entre ambos niveles se muestra en el siguiente esquema:



Es necesario que se provea lo pertinente para que en el momento oportuno se firmen los convenios respectivos, entre la COMASP y los distribuidores, que regulen las relaciones entre ambos en lo relativo a ejecución y operación de los sistemas. La COMASP ha presentado un modelo de contrato al prespecto que aparece en general como aceptable. En el mismo, sin embargo, correspondería afinarse el concepto costo en dos aspectos: 1) el tener en cuenta específicamente los distintos elementos de costo, que deben pesar en el establecimiento de la tarifa según exigencias del BID (alternativa de mayores exigencias) y 2) el considerar para la liquidación de tarifas a regir por un lapso dado (un año según Sección 6.1 del modelo presentado) determinado margen de seguridad, que evite que por aplicación de un costo histórico, no ajustado al costo dinámico influenciado por la inflación, se produzcan pérdidas en la COMASP y/o los distribuidores.

6.03 Situación financiera6.03.1 El Estado de São Paulo

1. El Estado de São Paulo ha de ser el eventual prestatario de la operación en estudio. En lo que sigue, analizamos brevemente su situación financiera.

La ejecución presupuestal de los últimos 4 años arrojó los siguientes resultados:

Cuadro No. 23

	<u>1964</u>	<u>1965</u>	<u>1966</u>	<u>1967</u>
	(En Miles de US\$)			
Ingresos de Operación	639.848	636.201	867.478	1.081.382
Impuestos y tasas	586.953	583.721	792.359	981.997
Empresas y Serv. Públicos	47.709	40.287	46.478	42.605
Entradas diversas	5.186	12.193	28.641	56.780
Otros ingresos propios	1.899	1.846	772	884
Total de ingresos corrientes	641.747	638.047	868.250	1.082.266
Gastos	638.344	637.779	784.392	1.057.290
Resultados corrientes	3.403	268	83.858	24.976
Contr. del Gobierno Federal	25.288	48.745	54.510	45.449
Total de ingresos	28.691	49.013	138.368	70.425
Cuenta de Capital (Inversiones y Amortizaciones)	184.131	279.311	255.865	210.825
Déficit	155.440	230.298	117.497	140.400

Tipos de cambio adoptados:

1964	1US\$ = 1.235 NCr.
1965	1US\$ = 1.912 NCr.
1966	1US\$ = 2.220 NCr.
1967	1US\$ = 2.715 NCr.

Puede verse a través de dichas cifras para todos los años analizados:

- 1ro. Superávit en los resultados corrientes
- 2do. Déficit en la cuenta de capital
- 3ro. Déficit en el resultado conjunto de resultados corrientes y la cuenta de capital.

Estos déficit, que alcanzan prácticamente al 11% del presupuesto, no son acumulativos, sino que se van atendiendo con partidas presupuestales

I-64

del año siguiente, enfrentándose las obligaciones financieras en el corto plazo con crédito bancario.

Por tal razón la deuda que se deriva de ellos no es de gran importancia relativa. (US\$200.676.717 al 30 de diciembre de 1967). Su significación financiera queda claramente demostrada en las cifras que siguen:

Cuadro No. 24
Intereses y Amortizaciones

	<u>Porcentaje de los</u> <u>intereses en los</u> <u>gastos corrientes</u>	<u>Porcentaje de amort.</u> <u>en los gastos de</u> <u>capital</u>
1964	.20	3.24
1965	.11	.27
1966	.04	.05
1967	.07	.04

El porcentaje tan reducido que los intereses y amortizaciones tienen frente a la evolución expansiva de los gastos del Estado de São Paulo, hace disminuir la significación en el plano financiero de los déficit mencionados.

2. Para el año 1968, el Presupuesto General del Estado de São Paulo ha quedado establecido, por la Ley No. 9938, del 6 de diciembre de 1967, en las siguientes cifras:

Cuadro No. 25
Estado de São Paulo
Presupuesto 1968

Miles de US\$ (1) (2)

Ingresos de Operación	1.241.009
Impuestos y tasas	1.161.038
Empresas y serv. Públicos	53.438
Entradas diversas	26.533
Otros ingresos propios	844
Total de ingresos corrientes	1.241.853
Gastos	1.062.473
Resultados corrientes	179.380
Cont. del Gobierno Federal	88.274
Total de ingresos	267.654
Gastos de capital	357.985
Déficit	90.331

(1) Tomados al tipo de cambio: US\$ 3.2 NCr.

(2) Los intereses de la deuda se han presupuestado en US\$3.313 mil y las amortizaciones en US\$228 mil.

Es decir que se prevé un nuevo año con resultados corrientes favorables aunque con un déficit final derivado del nuevo saldo negativo en la cuenta de capital.

Las partidas presupuestales a aplicarse al proyecto en estudio se analizan en la Sección de Análisis Financiero del Proyecto de este informe.

6.03.2. COMASP

Con relación a COMASP no hay lógicamente información financiera de carácter histórico.

Existe un balance de apertura al 11 de marzo de 1968, basado en los bienes traspasados de DAE a COMASP (estudios, diseños, planos y otros servicios de ingeniería relacionados con el Proyecto Juquerí, Capivari Monos y afluentes, así como el valor de las obras civiles contratadas y en ejecución, según avalúo oficial) y las integraciones en efectivo realizadas por DAEE. Este balance no ha sido presentado dictaminado.

Sintéticamente su forma es la siguiente:

C u a d r o N o . 26

COMASP- Estado de Situación Financiera al 11 de marzo de 1968

<u>ACTIVO</u>		
<u>Fijo</u>	<u>US\$1.000</u>	<u>%</u>
Bienes y propiedades	5.841.9	69.7
<u>Corriente</u>		
Caja	2.540.8	30.3
Total del Activo	8.382.7	100.0
<u>PASIVO</u>		
Patrimonio neto	8.382.7	100.0

Se está exigiendo en las recomendaciones, la presentación dentro de un año de la firma del contrato, de un inventario total de los bienes, derechos y obligaciones que se traspasen.

6.03.3 Análisis de DAE

Sobre la base de la información financiera, no dictaminada, presentada por DAE en cruzeiros hemos estructurado totalmente estados financieros de situación resumidos del organismo para los últimos años, dado que los balances de la empresa al no estar ajustados a las variaciones monetarias no son significativos a efectos analíticos.

Mostramos dichos estados financieros en el Apéndice No. 12. Tal información financiera tiene una validez relativa derivada de los procedimientos adoptados para la conversión de los activos fijos en dólares. Pese a lo aproximativo del método seguido las cifras de activo fijo para el año 1967, y las avaluadas por la empresa resultan muy similares.

1. Estados de Situación Financiera1.1 Evolución

Sumariamente expresadas las cifras del estado comparativo de balances de situación financiera son las siguientes:

Cuadro No. 27Comparativo de estados condensados de situación financiera

	<u>31 Dic.1965</u>		<u>31 Dic.1966</u>		<u>31 Dic.1967</u>	
<u>ACTIVO</u>	000*US\$	%	000*US\$	%	000*US\$	%
Fijo	211	91	236	93	248	94
Realizable	19	8	15	6	12	5
Disponibile	1	1	2	1	2	1
Total	231	100	253	100	262	100
<u>PASIVO</u>						
Patrimonio	219	95	242	95	246	94
Largo Plazo	3	1	3	1	2	1
Corto Plazo	9	4	8	3	14	5
Total	231	100	253	100	262	100

Tipos de cambio adoptados: 31/12/65 1US\$ = 2.220 NCr.
 31/12/66 1US\$ = 2.220 NCr.
 31/12/67 1US\$ = 2.715 NCr.

Estamos pues ante:

1. Un crecimiento constante en los activos del organismo (8% como promedio anual en los últimos 3 años).
2. Una estructura porcentual de activos que no ha variado fundamentalmente, notándose únicamente un descenso en la significación de los activos exigibles que del 8% del total de los activos que alcanzó en 1965, llegó al 5% en 1967.
3. Un cambio en la composición de los pasivos exigibles, en que muestran en el último año un mayor peso de las deudas a corto plazo.

1.2 Deudores

Hemos investigado las cuentas de deudores del organismo. Estas cuentas sin embargo, no registran las partidas a cobrar por venta de agua y alcantarillado al por menor, dado que estos movimientos se registran por el régimen de lo cobrado.

Un estado sintético de su evolución para los últimos ejercicios es el siguiente:

Cuadro No. 28

Demostración de la Cuenta "Deudores"

	1964		1965		1966	
	000'US\$	%	000'US\$	%	000'US\$	%
Ministerio de Hacienda (Contrib. del Estado)	2.703	58.0	17.284	92.4	13.942	91.8
Ministerio de Hacienda	1.282	27.5	486	2.6	-	-
Caja Económica Estado São Paulo-Préstamos	540	11.6	449	2.4	-	-
Abastecimientos	135	2.9	487	2.6	1.245	8.2
Total	4.660	100.0	18.706	100.0	15.187	100.0

Estamos pues, a partir de 1965, ante una reducción de los valores absolutos de la cuenta (en 1967 alcanzó a US\$11.957 miles), que frente al crecimiento del total de los valores del activo ha significado una aún más fuerte reducción de su significación porcentual.

Resulta sumamente ilustrativo el tener en cuenta que más del 90% de las cuentas a cobrar están radicadas hasta 1967 en las contribuciones a cobrar al Ministerio de Hacienda, y que las cuentas a cobrar por concepto de abastecimientos de agua al por mayor sólo alcanzan al 8% del total de los deudores. Sin embargo las cifras absolutas y relativas de los deudores por abastecimientos han ido creciendo consistentemente. Para 1967, los porcentajes de deudores por venta de agua tuvieron un fuerte incremento.

Por tal razón se ha examinado la evolución de la cobranza de las cuentas por ventas de agua al por mayor y por menor ("tarifas" y "tasas" respectivamente según la legislación del Estado).

Para llevar a cabo tal análisis hemos estructurado el siguiente cuadro de información básica:

Cuadro No. 29

Ejercicio	FACTURACION (US\$ millones)			RECAUDACION (US\$ millones)			Relación entre la recaud. y la emisión
	Tarifas de agua	Tasas de Agua y Alc.	Total	Tarifas de agua	Tasas de Agua y Alc.	Total	
1964	4.015	3.479	7.494	2.233	2.620	4.853	64.76%
				1.074(1)	2.238(1)		
			7.494	3.307	3.784	7.090	94.6
1965	7.214	4.626	11.840	4.478	3.398	7.876	66.52%
				1.437(1)	454(1)	1.891(1)	
			11.840	5.915	3.852	9.767	82.5%
1966	11.176	4.708	15.884	5.555	3.325	8.880	55.90%
				1.514(1)	706(1)	2.220 (1)	
			15.884	7.069	4.031	11.100	69.9%

(1) Recaudación correspondiente a facturaciones de ejercicios anteriores.

La relación entre la cobranza y la facturación por venta de agua al por mayor nos dan los siguientes porcentajes: 1964: 55.6%, 1965: 62.1% y 1966: 49.7%. Para las ventas al por menor la relación es respectivamente del 75.3%, 73.4% y 70.5%. Es decir una situación en deterioro en ambos niveles. Una visión de conjunto teniendo en cuenta la totalidad de lo recaudado, correspondiente a lo facturado en el ejercicio y a lo facturado en ejercicios anteriores, nos señala los siguientes porcentajes para 1964, 1965 y 1966: 94.6%, 82.5% y 69.9% que confirma la tendencia a empeorar que tiene la recaudación. Cifras aún no definitivas indican que este fenómeno ha continuado en 1967. Parte de este problema se ha centrado en el hecho de que en 1966-1967 se cambió el sistema de recaudación lo que provocó atrasos transitorios aún mayores. La administración de la COMASP está consciente de este problema.

En efecto, con el objeto de mejorar la eficiencia de esos servicios DAE resolvió recientemente sustituir el equipo convencional que viene realizando tales servicios (UNIVAC 60 y las respectivas maquinarias de periferia) por un sistema de equipamiento electrónico, montando así su Centro de Procesamiento Electrónico de Datos.

Además DAE adquirió 40 máquinas de perforar fichas de papel que conjuntamente con las máquinas de perforar fichas de cartón que ya posee han de constituir las fuentes de alimentación del Centro de Procesamiento.

Para mejorar su sistema de recaudación DAE está tomando también las siguientes medidas destinadas a actualizar su control de conexiones prediales de agua y alcantarillado.

- a) Adquisición de los planos provenientes del levantamiento aéreo-fotogramétrico realizado en la ciudad de São Paulo en 1967.
- b) Formación de una colección de planos de los Sectores geográficos de la ciudad obtenidos de la Prefectura del Municipio de São Paulo.
- c) Adquisición del conjunto de planos de todas las cuadras, con localización de los inmuebles, que componen los sectores geográficos.
- d) Compra a la Prefectura del Municipio de São Paulo de las cintas magnéticas que contiene el catastro de todos los contribuyentes de la ciudad.
- e) Modificación del Código de Usuarios de manera tal que el número de las conexiones prediales esté compuesto por el número del sector geográfico, el número de las cuadras y el número del lote en el cual está localizado el inmueble.

Para la ejecución de todo este plan de innovaciones técnicas, se ha trazado un programa de trabajo que está llevándose a la práctica.

2. Estados de Resultados

Siguiendo el procedimiento indicado para los estudios de situación financiera hemos reestructurado cuadros comparativos de resultados de DAE, a efectos de la investigación financiera:

COMPARATIVO DE ESTADOS DE RESULTADOS CONDENSADOS

	1 9 6 5		1 9 6 6		1 9 6 7	
	Miles US\$	%	Miles US\$	%	Miles US\$	%
Entradas de operación	8.952	100.0	9.453	100.0	10.309	100.0
Ventas de agua	5.038	58.6	6.117	64.7		
Servicio de alcantarillado	3.554	41.4	3.336	35.3		
Gastos de operación	13.556	157.8	17.295	183.0	18.977	184.1
Personal	5.325	62.0	6.936	73.4	8.590	83.3
Material de Consumo	1.695	19.7	1.097	11.6	2.367	23.0
Depreciación (1)	5.000	58.2	5.000	52.9	5.000	48.5
Varios	1.536	17.9	4.262	45.1	2.020	29.3
Subtotal	(4.964)	(57.8)	(7.842)	(83.0)	(8.668)	(84.1)
Otros ingresos propios	3.235	37.7	2.496	26.4	4.439	43.0
Resultados de Operación	(1.729)	(20.1)	(5.346)	(56.6)	(4.229)	(41.0)
Subvención Estado para personal	12.856	149.6	8.534	90.3	-	-
Resultados corrientes	11.127	129.5	3.188	33.7	(4.229)	(41.0)

Tipos de cambio utilizados para la conversión:

1965 1US\$ - 1.912 NCr.
 1966 1US\$ - 2.220 NCr.
 1967 1US\$ - 2.715 NCr.

- (1) La depreciación no ha sido registrada por la empresa en sus libros. Se la ha estimado a efectos de presentar un cuadro completo.

La situación de resultados finales puede sintetizarse de la siguiente manera:

Cuadro No. 31

Resumen de Resultados y Fondos
 (miles de US\$)

	Resultados			Fondos (Resultados y Depreciación)		
	1965	1966	1967	1965	1966	1967
Result. operación	(1.729)	(5.346)	(4.229)	3.271	(346)	771
Result. oper. más subsidio	11.127	3.188	(4.229)	16.127	8.188	771

En las cifras expuestas en ambos cuadros puede verse:

- 1) Un deterioro creciente de los resultados de operación, derivado del hecho de que los gastos operativos, han ido aumentando en el correr de los años con relación a los ingresos brutos.
- 2) Los resultados finales (aún considerando subsidios y los ingresos propios no directamente referidos a explotación) resultan negativos, por primera vez para 1967, básicamente porque no se recibió subsidio.
- 3) Desde el punto de vista de Caja, aunque los fondos excedentes van disminuyendo, aún para 1967 resultan positivos.

Es decir que se está en cualquiera de los planos que se analice la situación ante una clara tendencia a deteriorarse.

3. Estado de Origen y Aplicación de Fondos

Se ha estructurado el siguiente cuadro comparativo de origen y aplicación de fondos, para el año 1967 (1):

<u>ORIGEN DE FONDOS</u>	<u>Cuadro No. 32</u>	
	<u>1967</u>	<u>%</u>
	<u>Miles U\$S</u>	
Resultados	(4.229)	(24.2)
Ajustes monetarios	(347)	(2.0)
Resultados Ajustados	(4.576)	(26.2)
Depreciación	5.000	28.6
Aumento de capital	8.400	48.1
Mayor endeudamiento a corto plazo (2)	5.357	30.7
Reducción del activo exigible y realiz.	3.272	18.8
Total de origen de fondos	<u>17.453</u>	<u>100.0</u>

APLICACION DE FONDOS

Aumento del activo fijo	16.800	96.3
Aumento del activo disponible	246	1.4
Amortiz. de deudas a largo plazo	407	2.3
Total de aplicación de fondos	<u>17.453</u>	<u>100.0</u>

- (1) Los estados en dólares muestran diferencias derivadas de variaciones cambiarias. Su origen es el siguiente:

Cotización: NCR al 1/1/67 US\$0.45
 Cotización: NCR al 31/12/67 US\$0.37

	<u>Principio del Ejercicio</u>	<u>Aumentos del Ejercicio</u>
	<u>u\$S miles</u>	<u>u\$S miles</u>
Activos Monetarios	17.759	157
Pasivos Monetarios	<u>11.622</u>	<u>8.532</u>
Neto	6.137	8.375
Ganancias (Pérdidas)	(1.091)	744

Pérdida total por diferencia de cambio: 347 miles de u\$S.

- (2) Ajustados en u\$S 468 mil que se trasladaron del pasivo a largo plazo al pasivo a corto plazo por constituir porción corriente.

Estas cifras indican:

- a) La aplicación de fondos en el ejercicio se ha volcado fundamentalmente hacia los activos fijos.
- b) En el ejercicio 1967 la fuente de fondos se centró en los recursos de capital, 48,1%, en la depreciación, 28,6%, y en el mayor endeudamiento a corto plazo.

4. Indices financieros

Se han calculado índices financieros que siguen:

	<u>C U A D R O No. 33</u>		
	<u>1965</u>	<u>1966</u>	<u>1967</u>
Endeudamiento a corto plazo	.04: 1	.04: 1	.06: 1
Endeudamiento a largo plazo	.01: 1	.01: 1	.01: 1
Endeudamiento total	.05: 1	.05: 1	.07: 1
Corriente	2.04: 1	1.96: 1	.99: 1
Cobertura del servicio deudas por la utilidad operativa (1)	15.83: 1	8.94: 1	1.35: 1

- (1) Incluyendo subsidio estadual para gastos de operación.

Resulta de estos índices:

- a) Un endeudamiento moderado, con su tendencia a crecer basada en el aumento de las deudas a corto plazo.
- b) Un índice corriente basado en estados financieros que por la misma influencia del aumento de los pasivos a corto plazo se ha deteriorado rápidamente, con el resultado de que la empresa ha absorbido su capital de trabajo. Sin embargo, debe tenerse en cuenta que existen fuertes cuentas a cobrar a corto plazo (cobranza de agua y alcantarillado) que no han sido registradas contablemente, lo que conspira contra el nivel del índice.
- c) La cobertura de la deuda (interés y principal) por los resultados corrientes (antes de deducidos los intereses y depreciación) que hasta 1966 se hallaba en valores muy seguros ha bajado drásticamente en el año 1967 como consecuencia de que en este último año la entidad no recibió subsidios para gastos corrientes.

De incluirse depreciación como gasto operacional, los resultados no cubren el servicio de la deuda.

Como resumen de la situación de DAE podemos decir que según libros su liquidez no es adecuada, que carece de capital de trabajo (aunque existen factores que quitan importancia a este hecho) y que actúa con resultados deficitarios, pues sus ingresos propios no cubren sus gastos. En el aspecto de fondos la entidad no tiene problemas en sus operaciones corrientes (hasta 1966 recibió considerables subsidios del Estado). La cobranza se ha ido deteriorando aunque la administración está reaccionando ante este hecho.

6.04 ANÁLISIS FINANCIERO DEL PROYECTO

A efectos de realizar el análisis financiero del proyecto, lo hemos estudiado al nivel de la producción y al nivel de la distribución.

6.04.1 Análisis al nivel de la producción

A) Aporte local

El aporte local necesario al proyecto se ha de distribuir en el período de construcción de la siguiente manera:

Cuadro No. 34

Aporte local necesario

	<u>US\$ miles</u>
1968	11.250
1969	35.000
1970	18.000
1971	1.250
	<u>65.500</u>

Se ha negociado que obras realizadas desde el 15 de setiembre de 1967 hasta un monto de US\$3.300.000 podrán ser consideradas como aporte local al proyecto.

En lo que sigue se analiza la información existente a efectos de concretar las fuentes locales de donde ha de derivarse dicho aporte.

1. Presupuesto del Estado de São Paulo 1968

El aporte que se hará al proyecto en el año 1968, por parte del Estado de São Paulo, no aparece claramente identificado en el Presupuesto para el año 1968 del mismo. Con todo, aparecen partidas para gastos de capital sin identificación precisa que pueden cubrir las sumas necesarias a los fines del proyecto, ("Ampliación de Servicios Públicos" y "Servicios en régimen de Programación especial").

2. Plan Plurianual del presupuesto del Estado de São Paulo

El Plan Plurianual de Estado de São Paulo prevé para inversiones en la producción de agua a afectarse al proyecto para el año 1968 la cantidad de NCR 59.622 miles, para el año 1969, NCR 57.965 miles para el año 1970, NCR 16.381 miles, es decir en total la cantidad de NC\$ 133.968 miles a afectarse a las obras ya comenzadas o que se comiencen a construir en el año 1968. (Tal es el sentido del Plan Plurianual).

Suponiendo que dichos valores del Plan Plurianual no se ajustasen a las variaciones de precio y que el tipo cambiario se deteriorase en un 20% anual, el aporte local previsto en el plan plurianual sería el siguiente:

C u a d r o No. 35

	<u>N.C.R. Miles</u>	<u>US\$ Miles</u>
1968	59.622	18.631
1969	57.965	14.491
1970	16.381	3.276
1971	-	-
	<u>133.968</u>	<u>36.398</u>

Previendo modificaciones por ajustes de precios, es decir, convirtiendo las cifras en cruzeiros al tipo de cambio de LUS\$ = 2.70NCR, dicho aporte se sitúa en el orden de los 49.618 miles de u\$s, la cual aún deberá ajustarse hacia arriba según el mecanismo que rige la formulación de los planes plurianuales para comprender las obras a emprenderse del año 1969 en adelante.

3. Capitalización de la COMASP

Por otra parte, debe tenerse en cuenta que, como hemos mencionado anteriormente, se ha previsto capitalizar a la COMASP con NCr.300 millones en los años 1968, 1969 y 1970.

Debe tenerse en cuenta que:

- 1- Si bien esta suma ha de dedicarse exclusivamente para la producción de agua, en cambio no ha de comprender solamente el sistema Juqueri, Capivari Monos y afluentes.
- 2- Dicha capitalización comprende transferencias de obras ya realizadas y que en parte (las realizadas hasta el 15 de setiembre de 1967) no han de considerarse aporte local, según lo negociado con las autoridades competentes.
- 3- La Ley No. 10058 de 7 de febrero de 1968, por otra parte dispuso que:
 - a) Para atender el aporte de DAEE en 1968, el Poder Ejecutivo queda autorizado a abrir en la Secretaría de Hacienda, al DAEE, créditos especiales hasta NCr.90.000.000 (US\$28.125.000) (1) (Art. 13).
 - b) En los presupuestos de DAEE para 1969 y 1970 deberán incorporarse las sumas necesarias para que pueda realizar su aporte. (Artículo 12, Parágrafo único).

Como no se ha cuantificado el aporte en bienes que ha de hacer DAE, se desconoce a cuánto ha de ascender el aporte en efectivo que ha de ser efectuado por DAEE, y por lo tanto a cuánto han de ascender las partidas a ser integradas en efectivo en 1969 y 1970 (punto b).

Con todo resulta claro que con las partidas puestas a disposición de DAEE para 1968 (US\$28.125.000) (1) y las obras del sistema Juqueri, a completarse antes del contrato, a reconocer por el BID, US\$3.300.000, el aporte local al proyecto está asegurado para el año 1968 y parte de 1969.

Queda sin embargo una indeterminación en cuanto a los aportes para completar el proyecto por las razones expuestas en los puntos 1o. y 2o.

Por tal razón se hace necesario prever por legislación especial el aumento del capital de la COMASP o se asegure proveerla oportunamente de los fondos necesarios por vía distinta de capitalización, en la medida necesaria para absorber la totalidad de los costos locales del proyecto.

(1) Al tipo de cambio de 1US\$ = 3.2NCR.

I-76

B) Pronóstico financiero

Hemos estructurado un pronóstico de estado de resultados y un pronóstico del movimiento de fondo para COMASP para un lapso de 10 años.

Las bases para dicho cálculo obran en la parte técnica de este informe.

Las condiciones del préstamo adoptadas fueron las siguientes:

C u a d r o No. 36

	<u>Capital Ordinario</u>	<u>Fondos Suecos</u>
Monto	US\$11.5 millones	US\$5 millones
Amortización	20 años	25 años
Período de gracias	3.5 años	10 años
Plazo de desembolso	3.5 años	3.5 años
Intereses y comisiones	7.75% anual	2.50% anual
Comisión de servicio	1.25% anual	-

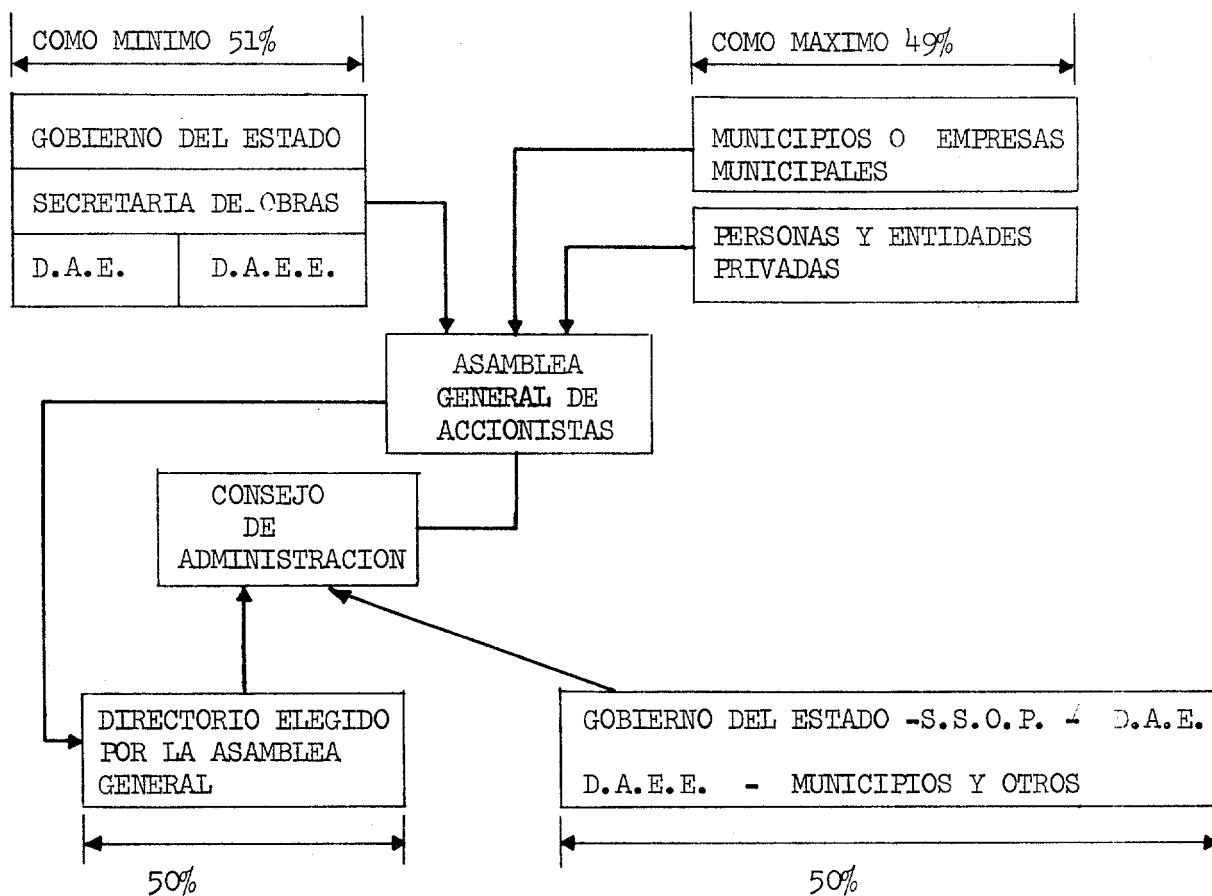
En el Apéndice No. 11 mostramos los cálculos realizados. Puede verse en ellos, que en el plano de la empresa productora los resultados del proyecto son siempre positivos y los fondos resultantes suficientes para atender la totalidad de las necesidades.

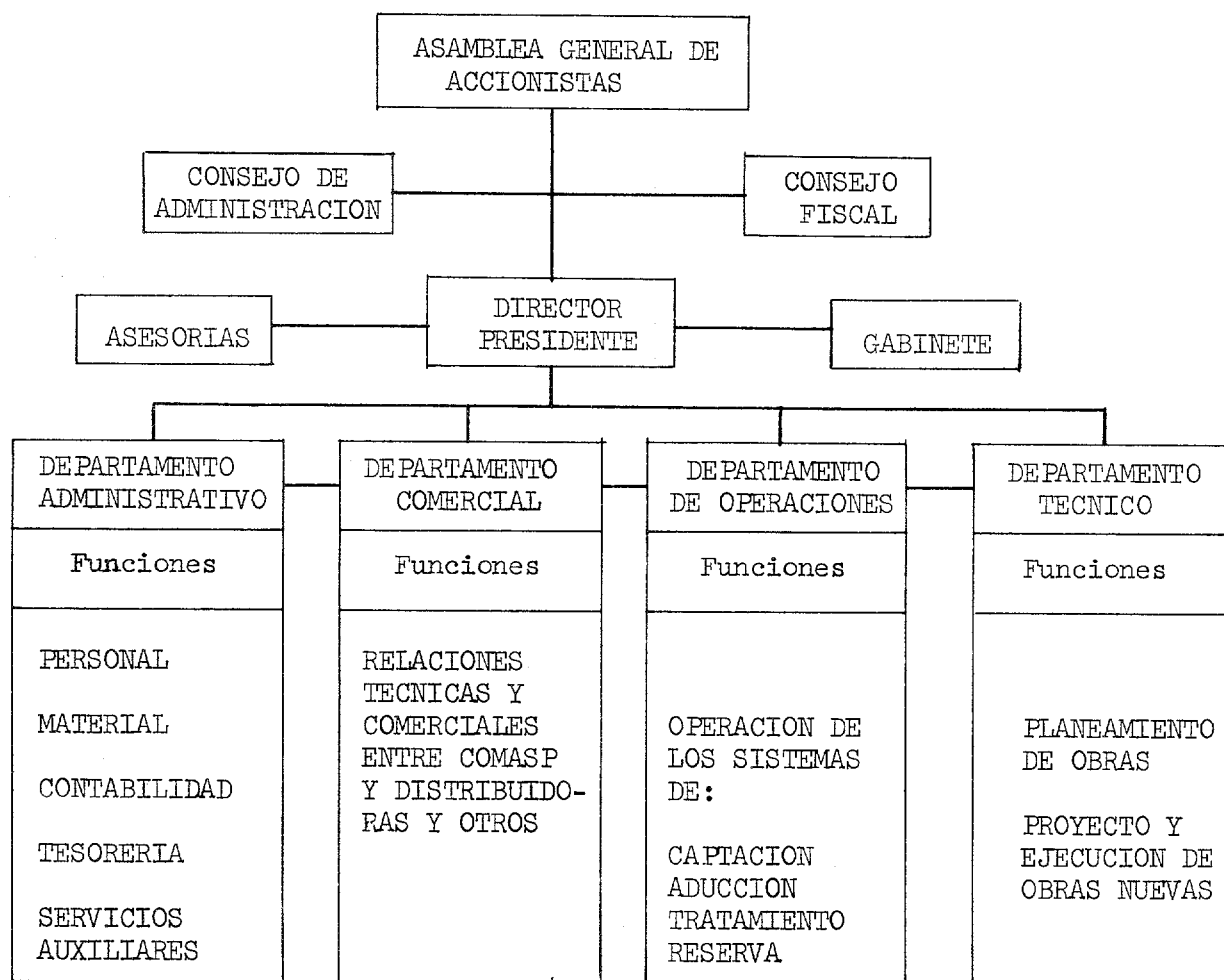
6.04.2 Análisis al nivel de los distribuidores

Hemos realizado asimismo un pronóstico de estado de resultados y un pronóstico de movimiento de fondo para DAE en su conjunto, dada la importancia que la buena situación de esta entidad ha de tener en la salud financiera del proyecto en su conjunto.

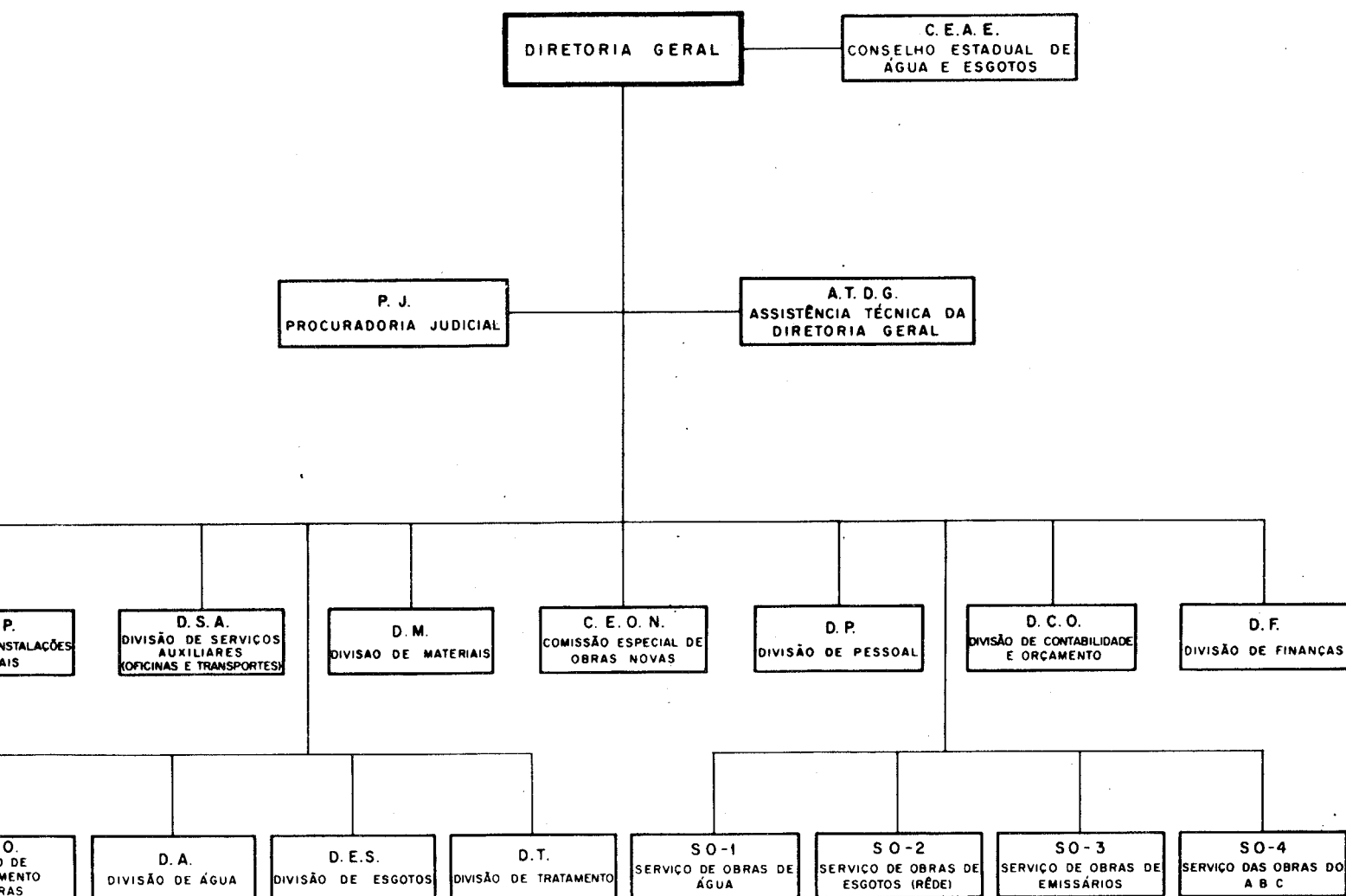
En el Apéndice No. 12 mostramos los cálculos realizados. Resulta de su análisis que no se prevén durante el lapso de 10 años que se ha estudiado, problemas de orden financiero para DAE.

ORGANOGRAMA GENERAL
DEL
SISTEMA



ORGANOGRAMA DE COMASP

ORGANOGRAMA ATUAL DO D.A.E.



NOTAS: OS ORGÃOS C.E.O.N., SO-1, SO-2, SO-3 e SO-4 TEM CARATER PROVISÓRIO
 A D.F. TEM EXISTÊNCIA DE FATO MAS NÃO LEGAL
 A LEI PREVÊ INCORPORAÇÃO DE SO-1, SO-2, SO-3, SO-4 e D.P.O.

D A E

Comparativo de Estados Financieros de Situación Condensados

	31 Dic. 1964		31 Dic. 1965		31 Dic. 1966		31 Dic. 1967
	Miles de US\$	%	Miles de US\$	%	Miles de US\$	%	Miles de US\$
ACTIVO							
Activo Fijo	197.419	97.1	211.169	91.3	236.138	93.1	247.938
Realizable							
Deudores	4.660	2.3	18.706	8.1	15.187	6.0	11.957
Otros	204	.1	284	.1	344	.1	302
Disponible	986	.5	1.126	.5	2.029	.8	2.275
Total del Activo	203.269	100.0	231.285	100.0	253.698	100.0	262.472
PASIVO							
Patrimonio	194.243	95.6	218.713	94.6	242.076	95.4	245.900
Exigible a Largo Plazo	4.941	2.4	2.713	1.2	2.695	1.1	1.820
Exigible a Corto Plazo	4.085	2.0	9.859	4.2	8.927	3.5	14.752
Total del Pasivo	203.269	100.0	231.285	100.0	253.698	100.0	262.472

Tipos de cambio utilizados: 1964 1US\$ = 1.850 NCR
1965 1US\$ = 2.220 NCR
1966 1US\$ = 2.220 NCR
1967 1US\$ = 2.700 NCR

El activo fijo existente al 31 de diciembre de 1964 se calculó al tipo de 1US\$ = 100 NCR. Las incorporaciones de los años subsiguientes se tomaron a los tipos de cambio promediales correspondientes a esos años. A la empresa de su activo fijo a 1967: US\$249.282

AGUA POTABLE - SAO PAULO

Pronóstico Financiero del Proyecto a Nivel de la Producción
COMASP
(miles de US\$)

1/

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
<u>Pronóstico de Resultados</u>										
<u>Ingresos</u>										
Venta de agua	-	-	-	4.032	8.064	8.064	8.064	8.064	8.064	8.064
<u>Gastos</u>										
Operación y mantenimiento	-	-	-	1.555	3.110	3.172	3.236	3.300	3.366	3.433
Depreciación	-	-	-	820	1.640	1.640	1.640	1.640	1.640	1.640
Intereses	-	-	-	501	949	895	845	787	733	679
Total de gastos	-	-	-	2.876	5.699	5.707	5.721	5.727	5.739	5.752
Resultados	-	-	-	1.156	2.365	2.357	2.343	2.337	2.325	2.312
<u>Pronóstico de Movimiento de Fondos</u>										
<u>Ingresos</u>										
Resultados	-	-	-	1.156	2.365	2.357	2.343	2.337	2.325	2.312
Depreciación	-	-	-	820	1.640	1.640	1.640	1.640	1.640	1.640
Aporte local	11.250	35.000	18.000	1.250	-	-	-	-	-	-
Préstamos BID	3.125	5.865	5.550	1.960	-	-	-	-	-	-
Dividendos retenidos	-	-	-	1.156	2.365	2.357	2.343	2.337	2.325	2.312
Total de ingresos	14.375	40.865	23.550	6.342	6.370	6.354	6.326	6.314	6.290	6.264
<u>Egresos</u>										
Proyecto	14.235	40.412	22.760	2.718	-	-	-	-	-	-
Dividendos retenidos	-	-	-	1.156	2.365	2.357	2.343	2.337	2.325	2.312
Intereses BID durante const.	144	464	810	505	-	-	-	-	-	-
Comisión de compromiso	123	78	29	-	-	-	-	-	-	-
Capital de trabajo	-	-	-	672	672	-	-	-	-	-
Amortiz. BID	-	-	-	696	696	696	696	696	696	696
Total de Egresos	14.502	40.954	23.599	5.747	3.733	3.053	3.039	3.033	3.021	3.008
Acumulado	(127)	(89)	(49)	595	2.637	3.301	3.287	3.1	3.269	3.256
		(216)	(265)	330	2.967	6.268	9.555	13.836	16.105	19.361

Los cálculos fueron realizados suponiendo que el servicio de la deuda con el BID sería realizado por COMASP. Ha llegado la información a la revisión de este informe de que dichos servicios han de ser realizados directamente por el Estado de Sao Paulo, por lo que los resultados de este cuadro han de ser aún más favorables.

AGUA POTABLE - SAO PAULO

Pronóstico Financiero a Nivel de los Distribuidores

Análisis de DAE

Pronóstico de Estado de Resultados

(miles de US\$)

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
ca de Agua										
Del ejercicio	10.850	11.248	11.642	17.320	21.929	21.929	21.929	21.929	21.929	21.929
De ejercicios anteriores	4.852	-	-	-	-	-	-	-	-	-
icio de alcantarillado										
Del ejercicio	8.727	9.205	10.093	20.955	24.199	27.499	30.799	34.099	37.399	40.149
De ejercicios anteriores	1.814	-	-	-	-	-	-	-	-	-
xiones de Agua	185	185	185	185	185	185	185	185	185	185
xiones de Alcantarillado	438	822	822	1.617	1.644	1.644	1.644	1.644	1.370	548
os	370	370	370	370	370	370	370	370	370	370
total de Ingresos	27.236	21.830	23.112	40.447	48.327	51.627	54.927	58.227	61.253	63.181
ación y mantenimiento servicio de (distribution)	9.148	9.148	9.518	10.341	12.486	12.735	12.990	13.250	13.515	13.785
ación y mantenimiento servicio de										
tos	6.666	6.666	7.037	7.037	7.407	7.407	7.777	8.148	8.148	8.518
os de conexiones de agua	161	161	161	161	161	161	161	161	161	161
os de conexiones de alcantarillado	381	715	953	1.406	1.429	1.429	1.429	1.429	1.191	476
eciación sistema de dist. de agua	1.693	1.705	1.715	1.800	1.885	1.971	2.056	2.141	2.226	2.311
eciación del servicio de alcantar.	1.165	1.202	1.492	1.644	1.862	2.085	2.307	2.529	2.788	3.122
de consumo de Agua a COMASP	-	-	4.032	8.064	8.064	8.064	8.064	8.064	8.064	8.064
reses de préstamos	236	195	150	106	66	38	24	11	1	-
total de gastos	19.450	19.791	25.058	30.559	33.360	33.890	34.808	35.733	36.094	36.437
resultados	7.786	2.039	(1.946)	9.888	14.967	17.737	20.119	22.494	25.159	26.744

AGUA POTABLE - SAO PAULO

Pronóstico Financiero a Nivel de los Distribuidores

Análisis de DAE

Pronóstico de Movimiento de Fondos

(Miles U\$S)

<u>Origen de Fondos</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
edos	7.786	2.039	(1.946)	9.888	14.967	17.737	20.119	22.497	25.159	26.744
iación-agua	1.693	1.704	1.715	1.800	1.886	1.971	2.056	2.141	2.227	2.311
iación-alcantarillado	1.165	1.202	1.492	1.644	1.862	2.085	2.307	2.529	2.789	3.122
buciones de mejora/redes agua	-	278	556	556	556	556	556	556	556	556
buciones mejora-redes gastos	-	889	2.551	3.889	5.450	6.611	6.667	6.667	6.667	6.667
s del Gobierno-Redes de alcantarillado	1.852	6.667	19.629	-	-	-	-	-	-	-
al de Origen de Fondos	12.496	12.779	23.997	17.277	24.721	28.960	31.705	34.387	37.598	39.400
<u>Aplicación de Fondos</u>										
sistema de distribución de agua	4.529	7.962	7.962	5.259	6.259	6.259	6.259	6.259	6.259	7.259
del sistema de alcantarillado	1.852	4.000	5.000	6.000	12.333	15.333	16.333	16.333	16.333	16.333
as y substituciones en el sistema										
distribución de agua	425	796	796	425	425	425	425	425	425	425
as y substituciones en el sistema										
alcantarillado	185	666	1.962	1.333	1.333	1.333	1.333	1.333	1.333	1.333
l de Trabajo	3.168	219	320	3.867	2.231	825	825	825	825	687
cación de préstamos	385	370	388	353	297	144	110	103	42	-
de Aplicación de Fondos	10.544	14.013	16.428	17.237	22.878	24.319	25.285	25.278	25.217	26.037
	1.952	(1.234)	7.569	(540)	1.843	4.641	6.420	9.109	12.181	13.363
acumulados	1.952	718	8.287	8.827	10.670	15.311	21.731	30.840	43.021	56.384

ECONOMIC EVALUATION OF THE JUQUERI PROJECTI SUMMARY OF RECENT ECONOMIC TRENDS OF BRAZIL

- 1.01 After an expansion of 3.1 per cent in 1964, Brazil's gross domestic product in real terms increased by 3.9 per cent in 1965 and 4.4 per cent in 1966. According to preliminary reports, GDP rose by 5 per cent in 1967.
- 1.02 The improved performance of the economy in 1967 is attributed mainly to agriculture, where available information indicates a substantial increase in the volume of crop production due to acreage expansion, favorable weather and a wider use of fertilizers. Thus, it is estimated that the total value of agricultural production in real terms increased by about 8 per cent, as compared to a 2 per cent decline in 1966.
- 1.03 Monthly statistical data on industry indicate that a slowdown which began during the last quarter of 1966 ended in mid-1967, as the Government introduced credit and fiscal measures in order to stimulate consumer demand and relieve the working capital problem of business firms. However, the recovery from the sharp decline has been somewhat slow, and it is estimated that industry's aggregate value to GDP expanded by no more than 3 per cent in 1967. Available figures indicate that during the first nine months of 1967 industrial consumption of electricity in the Rio de Janeiro and São Paulo area rose by 1.2 per cent compared to the same period of 1966 and the country's output of rolled steel products declined by 3.9 per cent. On the other hand, total cement output rose by 4.3 per cent, reflecting a strong upward trend in construction activities, stimulated by a housing program undertaken by the Banco Nacional de Habitação.
- 1.04 Increased economic activity improved tax collection procedures, and reform measures emphasizing taxes which are responsive to rising prices and incomes, brought about an expansion, in real terms, of 10.6 per cent in Central Government ordinary revenues during 1966, bringing them to NCr\$ 5,728 million or 12.9 per cent of GDP. Collection of the consumption tax, which is a source of almost 38 per cent of total revenues, rose by 19.6 per cent. Income tax collection, the second most important source of fiscal revenues, declined by 7.1 per cent, as additional tax deductions were introduced for both personal and business incomes. Import duty collections showed the strongest expansion, 47.1 per cent, reflecting the recovery of imports from their extraordinarily low level of 1965.
- 1.05 Central Government cash expenditures rose, in real terms, by a mere 4.8 per cent in 1966, reaching a total of NCr\$ 6,315 million, or 14.2 per cent of GDP. A breakdown of government expenditures into current and capital items remained the same as in 1965, current expenditures representing 59 per cent of the total.

- 1.06 As a result of the Government's efforts to increase its fiscal revenues while applying a firmer control to its expenditures, the cash deficit in 1966 was limited to NCr\$ 587 million or 10 per cent of revenues, compared to 18.2 per cent in 1965 and 38.5 per cent the year before. In addition, the bulk of the 1966 deficit was financed by non-inflationary means, as 57 per cent of it was covered with Treasury bonds and another 29 per cent with AID loans.
- 1.07 For the year 1967 the budget projected a cash deficit of NCr\$ 554 million or about 7.5 per cent of expenditures. By the end of June, however, the actual deficit came close to NCr\$ 1,000 million, mainly because of increased expenditures. Reasons for this increase include a large volume of commitments carried over from 1966, and extensive transfers to state and municipal governments. These transfers were necessary because tax revenues of states and municipalities in early 1967 fell short of estimates as a result of difficulties with the implementation of the constitutional reform of state and local taxation.^{1/}
- 1.08 Available preliminary figures indicate that the federal cash deficit reached NCr\$ 1,225 million by the end of 1967, or 18 per cent of total revenues. The latter declined, in real terms, by 9.8 per cent, reaching a total of NCr\$ 6,814 million. Simultaneously, cash expenditures rose by 2.4 per cent, to a total of NCr\$ 8,039 million.
- 1.09 Federal budget for 1968 projects both the revenues and the expenditures at NCr\$ 13.5 billion, or nearly the double of the last year's budget. But, included are for the first time several agencies hitherto only indirectly under Federal Government control. The budget is based on a 6 per cent increase in the GDP and a 20 per cent rise in prices. On the other hand, it does not include a provision for a 20 per cent pay rise granted in November 1967 to Federal civil servants; nor is there a provision for the substantial carryover into 1968 of undischarged obligations and unpaid Federal bills.
- 1.10 During the first seven months of 1967, the supply of money and quasi-money expanded by about 26 per cent as compared to only 7 per cent during the corresponding period of 1966. Simultaneously, total bank credit grew by 23 per cent as against a 12 per cent increase during the first seven months of the previous year. The sharp rise in bank credit originated in operations with both the Central Government and the private sector.

^{1/} According to this reform, as of January 1, 1967, the old state sales and consignment taxes (turnover excises) gave way to the new merchandise circulation tax, of value-added type. At the same time, various municipal taxes were substituted by municipal participation in state excise tax revenues.

- 1.11 The cost of living rose by only 24.5 per cent in 1967, against 41.1 per cent in 1966. This improvement was mainly due to the better performance of food prices which rose by only 14.1 per cent as compared with 40.2 per cent in the previous year.
- 1.12 Brazilian exports remained at about US\$ 1,400 million during 1961-1964, except in 1962, when the value declined to US\$ 1,214 million. In 1965 and 1966, however, exports increased by about 19 per cent and 9 per cent, respectively, to reach a total of US\$ 1,740 million, as a result of bumper crops of agricultural export products, especially sugar, cocoa and cotton. Similarly, sales of coffee abroad rose by 10 per cent to about US\$ 770 million, generating almost 45 per cent of total 1966 exports.
- 1.13 During the first ten months of 1967, exports were about 6 per cent below the total reached in the same period of 1966, because of a lower value of coffee shipments and a reduction in exportable surpluses of other agricultural commodities. Exports of manufactured goods, on the other hand, increased by 48.6 per cent; it is estimated that sales for the full year exceeded US\$ 140 million.
- 1.14 Total imports (CIF), which during 1960-1963 had fluctuated around an average of US\$ 1,470 million, declined to US\$ 1,260 million in 1964 and reached an unusually low level of US\$ 1,096 million in 1965. With a substantial expansion of industrial production in 1966, as well as replenishment of inventories and resumption of investment, imports in that year increased to almost US\$ 1,500 million.
- 1.15 In 1967, imports continued the recovery initiated in the previous year, as the Government liberalized import policies in order to induce greater efficiency in local manufacturing industry by exposing it to competition from abroad and, simultaneously, to reduce inflationary pressure by expanding the supply of goods available for domestic use. During the first ten months, imports were 18 per cent above the total reached in the same period of 1966.
- 1.16 The current account of the balance of payments at the end of 1966, showed a surplus of only US\$ 71 millions, compared to the extraordinary sum of US\$ 263 million a year earlier. At the same time, net long-term capital inflow increased to US\$ 212 million, compared to US\$ 183 million in 1965. Gross reserves of the Monetary Authorities amounted to US\$ 211 million at the end of November, 1967, compared to US\$ 409 million at the end of 1966.

II EXTERNAL PUBLIC DEBT AND DEBT SERVICE CAPACITY

- 2.01 In December 1966, Brazil's external public debt with maturity of one year and over, repayable in foreign currencies, was estimated at US\$ 3,202 million, of which US\$ 756 were undisbursed. The total debt represented 16 per cent of GDP, compared to a corresponding Latin American average indebtedness ratio of 12.7 per cent in 1965.

External long-term public debt repayable in foreign currency
as of December 31, 1966 a/
 (US\$ million)

	<u>Outstanding</u>	<u>Undisbursed</u>
<u>Total</u>	<u>3,202</u>	<u>756</u>
<u>Compensatory loans b/</u>	<u>1,254</u>	<u>79</u>
France	51	-
Germany	66	-
Italy	21	-
Japan	56	-
U.K.	13	-
U.S. c/	1,037	79
Others	10	-
<u>Project loans</u>	<u>1,721</u>	<u>677</u>
<u>International</u>	<u>586</u>	<u>349</u>
IBRD	387	226
IFC	18	12
IDB d/	181	111
<u>Bilateral</u>	<u>567</u>	<u>280</u>
U.S. e/	538	252
Germany	29	28
<u>Suppliers' credits</u>	<u>568</u>	<u>48</u>
<u>Convertible currencies</u>	<u>496</u>	<u>48 f/</u>
France	45	
Germany	62	
Italy	87	
Japan	86	
Switzerland	6	
U.K.	24	
U.S.	149	
Others	36	
<u>Inconvertible currencies</u>	<u>72</u>	
<u>Other loans g/</u>	<u>227</u>	

a/ Debt with an original or extended maturity of one year or more.

b/ Exclusive of IMF, US\$ 120 million.

c/ Includes: AID, US\$ 450 million (undisbursed US\$ 79 million); Eximbank, US\$ 490 million; Others, US\$ 97 million.

d/ Exclusive of loans repayable in cruzeiros at the borrower's option.

e/ Includes: AID, US\$ 314 million (undisbursed US\$ 226 million); Eximbank, US\$ 195 million (undisbursed US\$ 26 million); Others (PL-480, Title IV), US\$ 29 million.

f/ Estimate.

g/ Includes: petroleum arrears, AMFORP acquisition, bonded debt, and swaps.

Source: IBRD.

- 2.02 Among the Latin American nations, Brazil has had a large external public debt relative to total foreign exchange earnings. In 1961, as a result of the rescheduling of short-and medium-term debts and substantial stabilization credits extended by the United States Export-Import Bank and the European nations, the total long-term debt repayable in foreign exchange rose by about US\$ 700 million to reach US\$ 2,400 million. This level remained largely unchanged during the following two years as long-term development financing made available to Brazil was of moderate proportions.
- 2.03 As the 1961 debt rescheduling provided only a short-term relief, another debt renegotiation was undertaken in July 1964. As a result of these operations and of repayments of short-term debts, the Brazilian debt structure has improved considerably during 1965 and 1966. As of the end of 1966, suppliers' credits declined to less than 18 per cent of the total debt of US\$ 3.2 billion. Simultaneously, practically all commercial and petroleum arrears as well as swap transactions have been liquidated.

Short- and Medium-Term External Debt Repayable in
Foreign Currencies Outstanding at the End of Each Year
(millions of dollars)

	<u>1963</u>	<u>1964</u>	<u>1965</u>	<u>1966 a/</u>
<u>Total</u>	<u>1,060</u>	<u>881</u>	<u>500</u>	<u>288</u>
Commercial arrears	122	223	-	-
Oil companies	55	5	52	7
Swaps	364	313	123	12
Foreign exchange liabilities	198	131	117	117
Other	118	45	32	32
U. S. Treasury	36	25	17	-
IMF	167	139	159	120

a/ Preliminary

Source: Banco Central do Brasil, Relatório de 1965, page 140 and CIAP/80, Documento apresentado pela Delegação do Brasil, page 7.

- 2.04 In spite of the reduction of Brazil's short- and medium-term obligations and the increase of the long-term component of the foreign debt, service payments to be made in the next few years still represent a heavy burden on foreign exchange availabilities. In 1967, these payments amounted to an estimated 21 per cent of current account earnings being expected to diminish gradually to a little less than 14 per cent in 1971.

- 2.05 The following table shows the projected service on Brazil's long-term external public debt repayable in foreign currencies as of the end of 1966.

Estimated Long-Term External Debt Service Payments
In Foreign Currencies, on Debt as of December 1966
 (millions of dollars)

	<u>Amount in million dollars</u>	<u>Percentage of 1966 current accounts earnings of US\$ 2,093 million</u>
1967	442 <u>a/</u>	21.1
1968	402 <u>a/</u>	19.2
1969	349	16.7
1970	301	14.4
1971	282	13.5

a/ Does not include IMF (amortization and interest); US\$ 34 million in 1967 and US\$ 92 million in 1968.

Source: IBRD.

- 2.06 On the basis of the country's economic performance in the recent past and its growth potential, it may be considered that Brazil is credit-worthy for additional foreign borrowing, provided the Government continues to pursue sound monetary and fiscal policies. In view of heavy service payments on existing debt, however, the new loans should provide appropriate grace periods that would not require amortization payments before 1971 or 1972. Furthermore, additional long-term external borrowing should be used principally to finance high priority investment projects that exert a substantial favorable impact on Brazil's national product and its balance of payments or provide economic infrastructure required to eliminate bottlenecks to a sustained rate of growth.

III. ECONOMIC EVALUATION OF THE PROJECT

Introduction

- 3.01 The project's area of influence covers the center of the most highly developed and densely populated region of Brazil. With an area of 250,000 square kilometers (less than 3 per cent of the country's territory), the State of São Paulo contains approximately 19 per cent of the 1967 estimated national population and accounts for about 33 per cent of the national income and 58 per cent of the gross value of industrial production. In 1960, the per capita income for this State was 78 per cent higher than the average for the country as a whole. 1/ During 1950-1960, the industrial product of the State grew at 13.2 per cent per annum.
- 3.02 In 1965, the State contributed 51 per cent of total Federal Government tax revenues (including import duties and charges). At the same time, total expenditures of the State of São Paulo nearly equalled those of all other States put together. 2/
- 3.03 Along with the economic development, the State's population has been growing at 3.6 per cent annually, compared with 3.1 per cent for the country as a whole. Natural growth accounted for 2.5 per cent of the rate while the rest, 1.1 per cent, is attributed to a net migratory movement, particularly from the Northeast.
- 3.04 In 1950, São Paulo became the first Brazilian State with more urban than rural population. The degree of urbanization rose to 63 per cent in 1960 and is projected to reach 71 per cent in 1970. About two-thirds of the State's urban population is concentrated in the City of São Paulo, which is the main center of industrial activity, employing 650,000 persons in 1966, or more than all the rest of the State. 3/ Another important part of that population is concentrated in the industrial tri-cities "ABC"- Santo André, São Bernardo and São Caetano - which are included in the metropolitan area called Grande São Paulo.

Present Water Supply Situation

- 3.05 The present system of water supply in the City of São Paulo and its environs evolved through a series of emergency measures dictated by repeated crises of water shortage. As a result, the system is rather complicated and difficult to operate, and its components are interconnected to only a very limited extent.

1/ Estado de São Paulo, Plano de Desenvolvimento Integrado 1964-1966.

2/ IBGE, Anuário Estatístico do Brasil, 1967.

3/ Estado de São Paulo, Plano de Desenvolvimento Integrado 1964-1966, and SERETE S.A., Projeto Juqueri-Relatório de Viabilidade, Sept. 1967, page 26.

- 3.06 Between 1945 and 1966, the population of the City of São Paulo grew at a rate of 5.8 per cent per annum, to reach a total of 5.1 million inhabitants. At the same time, however, the water provided by the public system grew at a rate of only 4.1 per cent, to reach 11 m³/sec. ^{1/} Thus, although an extended distribution network made it possible to increase the number of inhabitants served by the system - from 49.6 per cent of total population in 1945 to 53.5 per cent in 1966 - the customers' per capita supply declined from 574 litres per day to 322 litres per day. ^{2/}
- 3.07 Furthermore, due to the lack of an adequate volume of water supply, a large number of homes in certain zones of the metropolitan area are not connected to the distribution networks. For the same reason, plans for further network expansion were drastically curtailed after 1962. This action affected particularly the northern zone of the City. In fact, data provided by the State Departamento de Aguas e Esgotos (DAE) show that public water supply of the northern zone did not increase at all between 1945 and 1966. The present project intends primarily to improve the situation in that zone.

Effective Water Supply in Sao Paulo
(in m³/sec.)

<u>Zones</u>	<u>1945</u>	<u>1966</u>
North	0.8	0.7
South	0.8	6.6
East	2.5	2.7
West	<u>0.7</u>	<u>1.0</u>
Total	<u>4.8</u>	<u>11.0</u>

Source: SERETE, op.cit., page 30.

- 3.08 Industrial plants located in the City cover only 16 per cent of their water needs from the public system; for the rest, they have to rely on self-supply, from rivers or wells. The metropolitan area as a whole shows an even less favorable situation, as several municipalities agreed in contracts with the DAE not to supply water to industries.

^{1/} Nominal capacity of supply in 1966 reached 12 m³/sec. In 1967, the system which supplies the industrial tri-cities "ABC" increased the total capacity to 14.4 m³/sec.

^{2/} SERETE, op. cit., page 35.

Water Consumption by Industries in São Paulo

<u>Source</u>	<u>City</u>		<u>Metropolitan Area</u>	
	<u>m³/day</u>	<u>%</u>	<u>m³/day</u>	<u>%</u>
Public system	35,869	16	47,017	9
Rivers	133,656	57	399,496	71
Wells	63,809	27	113,019	20
<u>Total</u>	<u>233,334</u>	<u>100</u>	<u>559,532</u>	<u>100</u>

Source: SERETE, op. cit., annexes 7 and 8.

- 3.09 While the use of subsoil water for industrial activities offers but limited and diminishing possibilities of expansion, the purification of heavily polluted, repeatedly used water from rivers in the area (Tietê, Pinheiros, Tamanduateí), makes this source increasingly costly: the cost is currently estimated at NCr\$ 0.24 per m³, compared to a rate of NCr\$ 0.15 per m³ currently being charged by the public system. Furthermore, for some industries the quality of water from the rivers is far from being satisfactory, particularly for food industry, beverages, chemical industry and pharmaceutical products. Obviously, this situation could deter future industrial growth and affect decisions to invest in the area.
- 3.10 Potable water supply is subject to daily water shortages and pressure failures; the poor condition of the distribution network, caused by delayed replacement and repairs, results in losses of nearly 20 per cent of total supply, according to DAE. Furthermore, it is reported that the sanitary treatment of the water is insufficient.
- 3.11 As a consequence of the insufficient public water supply, the population relies heavily on privately built wells. Because of a rising density of population, however, these wells are drying out and, simultaneously, the danger of pollution is increasing. A recent survey of a sample of 5,000 wells by DAE showed that 80 per cent of these were polluted, primarily because of their closeness to sewage. The Health Center of Santo Amaro reported that close to one-third of the wells in that urban area were within 10 meters from the nearest ditch and that local soil conditions led to frequent seepage.
- 3.12 The potable water situation is particularly critical in the northern zone and other predominantly poor neighborhoods where, combined with substandard hygienic conditions and malnutrition, it contributes to an unduly high prevalence of water-borne diseases.
- 3.13 An analysis of general health conditions in the city of São Paulo in 1961, showed that 54 per cent of deaths occurred at ages under 50 years (compared to approximately 20 per cent in the United States). Children under 1 year of age alone accounted for 23 per cent of the total. 1/

1/ Estado de São Paulo, op. cit., page 56.

- 3.14 As far as water-related diseases are concerned, reports do not indicate morbidity rates for newborn babies and for the economically active population. Nor is it possible to measure the worker absenteeism caused by these diseases. On the other hand, the State Statistical Department (Serviço de Estatística da Saúde) reported 2,361 deaths in the City in 1963 as caused by "gastritis, duodenitis, enteritis and colitis, excluding diarrhea of new-born infants", or a mortality rate of 55.2 per 100,000 inhabitants. Epidemiologic studies of situations similar to those in São Paulo indicate that an adequate water supply could reduce the incidence of water-borne diseases by 30 to 60 per cent. 1/

The Project

- 3.15 Faced with an increasingly critical water supply situation, the State Government is preparing an integrated plan to provide, eventually, adequate water services not only to the fast growing Capital, but also to most of its metropolitan area. The latter had a population of 6.8 million in 1966, and the number is projected to reach 18 million in the year 2000. The Government plan calls for development of a system to supply 85 per cent of the projected population at the end of the century, or 15.3 million persons, with 400 litres of potable water per capita per day. This would require a total supply capacity of 71 m³/sec.; the current capacity is only about 14 m³/sec. The Juquerí project is part of the integrated plan, which will be implemented by stages. The present water supply deficit in the Capital is estimated at 7 m³/sec. and - as long as this or some other project is not executed - the deficit will continue growing by about 1 m³/sec. per year.
- 3.16 The plan of the State of São Paulo contemplates the tapping of several available water sources. Among these, the capacity of the lake Guarapiranga system could be increased by some 10 m³/sec. by diverting two rivers from the Atlantic side of the Serra do Mar. Another diversion from the same mountain range could add about 14 m³/sec. to the Rio Claro system. Streams on the northern slopes of Serra da Cantareira offer still another source of supply, which is the base for the present project.
- 3.17 In 1964, the State authorities reviewed several preliminary plans for expanding water supply in São Paulo, prepared by local consulting firms and by technicians of the DAE. From among the available new supply sources, the Juquerí project was given first priority, and the decision was re-confirmed in 1966. The choice was based primarily on two considerations: (1) estimated cost of intake and conduction, per m³/sec., was substantially lower than from other available sources, and (2) no other source offered the possibility of nearly doubling, in 3 to 4 years, the present total supply capacity. The following table summarizes the various alternatives and their relative priority 2/:

1/ J.M.Henderson, Water Supply Consultant, Water Supply for Belo Horizonte, USAID, Rio de Janeiro, 1966.

2/ SERETE, op. cit., page 85.

<u>Source</u>	<u>Unit cost index (Juquerí-100)</u>	<u>Supply (in m³/sec.)</u>	<u>Priority</u>
Guarapiranga system	50	3.3	a/
Baixo Cotia	73	0.15	
Lake Billings (Rio Grande)	93	4.0	b/
Rio Claro (Alto Tietê)	93	4.6	c/
Juquerí	100	10.0 d/	1
Alto Cotia	120	..	2
Capivari-Monos-Mandu	133	5.5	3
Itatinga-Itapanhaú	147	9.2	4
Juquirá	200	..	5
Paraíba (Alto Tietê)	233	..	6
Cabuçu (Rio Claro)	300	..	7

a/ Completed in 1966.

b/ Under construction in 1967.

c/ The treatment of the heavily polluted water in the Rio Claro case would be costlier than in the case of Juquerí, where the quality of the water is more satisfactory.

d/ To reach 22 m³/sec. in a later stage.

3.18 The selection of Juquerí was further based on the following considerations:

- a. the relatively short distance between the Juquerí dam and the city distribution network,
- b. the opportunity of solving the particularly critical water shortage in the city districts north of the Tietê river,
- c. the possibility of doubling the Juquerí system capacity in a subsequent stage.

3.19 The project consists in the diverting of two rivers, Juquerí and Atibaia, from the Cantareira hills which can produce rapidly a volume of not less than 10 m³/sec. of potable water. Simultaneously, provisions are being made to increase the flow in a later stage to about 22 m³/sec. In addition to the diversion of the two rivers, the project includes water storage facilities, pumping, treatment stations, instrumentation, control equipment, and the principal sub-conduits. The project, on the other hand, does not include an expansion of the distribution network, as this is a task corresponding to DAE in the City and to the respective municipalities outside the city limits. According to established policy, the user defrays the cost of his connection with the network.

3.20 At a daily rate of 400 litres per capita, the project's 10 m³/sec. would serve approximately 2.2 million people. While the treated water will be channelled to various zones of the metropolitan area depending on the needs, it is expected that a very large part of the total flow will benefit the northern zone, where population is expected to increase from 1,080,000 inhabitants in 1965 to 1,510,000 in 1980. 1/

1/ The projection is from a July 1967 report on the São Paulo sewerage system, prepared under AID contract by the consulting firm Hazen & Sawyer, of New York.

- 3.21 The consultants' studies show that the project should be financially self-liquidating, provided that leakages can be reduced and water rates of COMASP 1/ adjusted adequately. Currently, the public water supply system (DAE) charges the following customer rates: 2/ a) for a minimum consumption of 15 m³ per month, NCr\$ 0.10 per m³, b) for a consumption of more than 15 m³ per month, NCr\$ 0.15 per m³.
- 3.22 Thus, the minimum monthly bill amounts to NCr\$ 1.50: a person earning the minimum legal wage would pay his annual consumption of water with 5 1/2 days of work. The minimum rate compares with other Brazilian cities as follows: 3/

	Rate (NCr\$ /m ³)	Minimum consumption (m ³ /month)	Minimum monthly bill (NCr\$)
São Paulo	0.100	15	1.50
Rio de Janeiro	0.073	30	2.19
Recife	0.090	30	2.70
Pôrto Alegre	0.100	20	2.00
Curitiba	0.080	35	2.80

- 3.23 The water rates in São Paulo are adjusted in accordance with changes in the legal minimum wage. The latter is revised about once a year 4/ but, due to conservative revisions, the real wage rate has been declining from 1964 through 1967. The resulting water rates have not been sufficient to generate enough income for DAE to cover its operating expenditures and also provide for its investment needs, and the entity has been receiving annual subsidies from the State's treasury. For the year 1968, the State's budget assigns to the public water system an amount of NCr\$ 108.6 million, or 9 per cent of the State's total budgeted expenditures of NCr\$ 1,227.9 million. 5/

1/ Companhia Metropolitana de Aguas de São Paulo, a mixed society established in December 1967 by decision of the State Government to be in charge of the whole public water system in the São Paulo metropolitan area. It would sell all the water "wholesale" to DAE and municipalities for local distribution.

2/ SERETE study, page 227.

3/ SERETE study, page 152.

4/ In February 1967, the minimum wage in São Paulo reached NCr\$ 105 per month.

5/ Estado de São Paulo, Diário Oficial, December 29, 1967. The budget does not specify the amount earmarked for Juquerí project.

- 3.24 It should be pointed out that inadequate water rates are a rather common phenomenon in Brazilian cities. Thus, a 1964 survey of 201 cities in the State of São Paulo showed that ordinary revenues of their public water systems covered, in the average, only 75 per cent of their expenditures. ^{1/} Similarly, in 1967, the Planning Ministry of the Central Government reported that municipalities "generally" adopt inadequate rate policies, which thus do not provide sufficient funds for maintenance and expansion of the services and, frequently, do not even cover their current expenditures, with the resulting rapid deterioration of the systems. ^{2/} The Juquerí project offers an opportunity to correct the current water rate structure in the São Paulo metropolitan area in a way which would permit better public services in the future while, at the same time, the burden now carried by the taxpayer would be shifted to those using the services.
- 3.25 The project would have an impact on local industries, which are to receive 2.3 m³/sec. or close to one-fourth of the project's total water flow. At present, industries in the city of São Paulo consume about 233,000 m³ of water per day, all but 16 per cent of which is self-supplied (mainly from heavily polluted rivers). The project would increase the supply to industries by 86 per cent, and the volume supplied to them by the public system would increase by 460 per cent. Thus, already in this first stage of a broader program, a potentially serious deterrent to further industrial expansion in São Paulo would be reduced.
- 3.26 While it is not possible to estimate the volume of new local business which would develop as a result of execution of the Juquerí project, construction industry and related activities would benefit from increased residential building in areas which are to be connected with the public water system. ^{3/}
- 3.27 The impact of the proposed project on the well-being of local inhabitants would be highly significant: by nearly doubling - in three to four years - the quantity and improving the quality of water for domestic use, it would bring about a marked improvement in public health conditions in the country's biggest urban center. It would help to correct the growing water supply inadequacies which, if not checked, could also seriously affect the economic development in the area.

^{1/} Comissão Interestadual da Bacia Paraná-Uruguai, Equipamentos Urbanos de Água e Esgotos no Estado de São Paulo, São Paulo, 1964.

^{2/} Ministério do Planejamento, Plano Decenal de Desenvolvimento Econômico e Social, volume VI "Saúde e Saneamento", p. 46.

^{3/} It should be pointed out that no urban development plan exists in São Paulo, but one is being prepared and should be ready before the end of 1970.

- 3.28 Direct economic benefits of a water supply project are usually measured in terms of the cost of achieving the same results by the most likely alternative means. In this case, as already indicated, the cost comparison of available alternatives favored the Juquerí project. It should be pointed out, however, that no other single source would provide a comparable flow. Furthermore, no alternate project is ready for immediate execution. The higher costs of an alternate project would also be burdened with a suspension of the already advanced work on the Juquerí project.
- 3.29 Where an alternative source is not available or would not be economically feasible, the benefits may be valued on the basis of the value of water to users, measured by the increased water flow, valued at adequate water rates. Viewed from this angle, the (minimum) economic return is approximated by the financial yield of the project, expressed as a percentage of investment.
- 3.30 Finally, economic benefits derived from reduced incidence of water-borne diseases may be high enough to exceed the total cost of a potable water project in a less-developed country. A report on a project in Puerto Rico.^{1/} concluded that public health benefits reached an economic break-even point about ten years after completion of a water system, and the benefit/cost ratio approached 2.5 at the end of the useful life (50 years) of the system. The benefits were measured in terms of projected net earnings of economically active population, i.e., gross personal earnings less consumption expenditures. Three types of benefits were considered: those derived from reduction of (1) mortality rates, (2) morbidity rates (the morbidity factor involved an estimate of the loss in net earnings by workers with acute water-borne disease infection who were absent from the job), and (3) debility of on-the-job workers. Projections had to be made of the workers' potential total wages, the total personal consumption and, also, the total number of workers in any particular age group. At the same time, the reduced occurrence of water-borne diseases, attributable to the project, had to be quantified. As the authors pointed out, the resulting estimate of the money value of the workers was entirely dependent upon the accuracy of the projections performed. Lack of statistical data precludes the use of this method in the Juquerí project.
- 3.31 Since direct and indirect imports would be financed by the IDB, the immediate impact on Brazil's balance of payments would be negligible. The longer-run debt service burden would be spread over the period of the foreign loan repayment. This would be more or less compensated by the effect of increased productivity, which would accompany improved health conditions and which could be expected to result in some expansion of exports from the area and additional import substitution by São Paulo industries. On the other hand, these positive factors would be offset in part by increased imports of consumer goods as a result of incremental personal incomes attributable to the project.

^{1/} Pyatt and Rogers, "On estimating benefit-cost ratios for water supply investments", Journal of Public Health, October, 1962.

Conclusions and Recommendations

- 3.32 Execution of the project is economically and socially justified. From among the various alternative water supply sources, which sooner or later are to be tapped in accordance with local long-term needs, the Juquerí project appears to be one of the least costly, and construction works are already well advanced. It should be noted that there is an ample local contribution (80 per cent of the total cost of the project) and that new rate schedules are to make the project financially self-liquidating. According to the information received from the loan applicant, at least half of the water supply obtained from this project will benefit the city's northern zone, which is characterized by the low income levels of its inhabitants.
- 3.33 The project should make it possible to introduce into the São Paulo water supply system, rate schedules which will produce sufficient revenues to (1) cover all operating expenses of the system, including proper provision for administration, operation, maintenance, interest, depreciation, and amortization of non-depreciable items, (2) provide for the timely repayment of all the obligations of the debtor, and (3) yield an adequate return on the equity investment. The rates would also have to be adjusted in accordance with the rising costs of the services: in view of the unsatisfactory past experience with the minimum legal wage, future adjustments might be based on the cost-of-living index, although it is possible that in the future the minimum wage index may keep up adequately with the costs of the system, especially if the inflation in Brazil is brought under better control.

Parecer JurídicoI - Do Mutuário:

O mutuário do empréstimo deverá ser o Estado de São Paulo. Sobre sua personalidade jurídica e capacidade para contratar o empréstimo não pode existir dúvida. Antes da contratação, porém, deverá o Governo do Estado apresentar comprovante do atendimento das seguintes exigências legais: 1/

- a) Autorização da Assembléia Legislativa Estadual, nos termos do item IX do art. 16 da Constituição do Estado, na qual fique identificada a operação, com referência, inclusive, à aceitação de cláusula pela qual o mutuário se obrigue a dirimir por arbitramento todas as dúvidas ou controvérsias relativas ao contrato ou à sua execução;
- b) autorização do Senado Federal, em obediência ao disposto no item II do art. 45 da Constituição Federal;
- c) decreto designando, se fôr o caso, o representante do Governo do Estado na contratação.

II - Do Executor do Projeto:

1. Em 20 de janeiro de 1954 foi criado o Departamento Estadual de Águas e Esgotos, entidade autárquica, portanto com personalidade jurídica própria e autonomia administrativa e financeira. Cabe-lhe "projetar, executar, ampliar, remodelar e explorar, diretamente, os serviços de água potável e de esgotos sanitários". (Inciso I do art. 4º da Lei No. 2.627).
2. Para êsse efeito, encarrega-se o D.A.E. dos sistemas de abastecimento de água, a partir da captação até a distribuição domiciliar, nos municípios de São Paulo e Osasco, e somente dos de captação, adução e tratamento nos municípios de Cotia, Guarulhos, Mauá, Santo André, São Bernardo do Campo e São Caetano do Sul. Nestes últimos, os sistemas de distribuição ficam a cargo das respectivas administrações municipais. Além disso, foram já celebrados convênios entre o D.A.E. e os municípios de Diadema, Embu, Carapicuíba e Barueri, também na área da "Grande São Paulo", para atendê-los, exceto quanto à distribuição domiciliar.
3. Ocorre, entretanto, que, pela Lei No. 10.058, de 7 de fevereiro de 1968, foi criada a Companhia Metropolitana de Água de São Paulo (COMASP), sociedade de economia mista, sob o controle acionário do Estado de São Paulo, regida pela Lei das Sociedades por Ações.

1/ Para maior clareza da exposição, os aspectos relativos à contribuição de recursos financeiros locais para a execução do projeto são examinados na Seção V dêste parecer.

4. De acôrdo com aquêlê diploma legal, compete à COMASP a captação, adução, tratamento e condução de água, para venda, por atacado, aos municípios que constituem a "Grande São Paulo". Cabe às administrações municipais, diretamente ou através de entidades permissionárias, a distribuição domiciliar de água.
5. Verifica-se, portanto, que a COMASP deixou ao D.A.E. apenas o encargo de distribuição, de que o projeto em consideração não trata. Pode-se estabelecer, assim, que deverá ser a COMASP a entidade executora na operação em exame.
6. A estrutura administrativa e a representação da nova empresa serão estabelecidas em seus estatutos, que se encontram em fase de elaboração.
7. Tendo em vista tratar-se de pessoa jurídica de direito privado, sob a forma de sociedade anônima, não está a COMASP sujeita à legislação que prescreve o sistema de licitação pública para a contratação de obras ou serviços e para a aquisição de bens. Nada impede, entretanto, do ponto de vista legal, que a COMASP se obrigue a adotar, para tal fim, o método de licitação pública que se convencionar no contrato de empréstimo.
8. Compete às entidades distribuidoras de água a varejo fixar os preços de venda da mesma, sendo certo, entretanto, que não poderão deixar de levar em conta as limitações legais da cobrança de taxa de consumo de água. Assim, dispõe o art. 4º da Lei Estadual No. 9.580, de 30 de dezembro de 1966, que tal taxa, a ser fixada e cobrada no município de São Paulo, pelo D.A.E., não poderá exceder, em cruzeiros por metro cúbico, as seguintes frações do salário-mínimo mensal que estiver em vigor na Capital do Estado:
 - a) para o consumo mínimo de $15m^3$ por mês: 0,0001
 - b) para o consumo acima de $15m^3$ por mês: 0,0015
9. Resulta de tal limitação que os preços de venda de água por atacado, cuja fixação competirá à COMASP, deverão refletir dita restrição.
10. A COMASP tem capacidade legal para executar o projeto e para figurar como interveniente na contratação. Antes da mesma, porém, deverão ser apresentadas:
 - a) fôlhas do Diário Oficial contendo a ata da sua assembléia de constituição, com transcrição do certificado de registro da mesma na Junta de Comércio;
 - b) estatutos da empresa;
 - c) fôlhas do Diário Oficial contendo a ata da assembléia que haja autorizado a referida intervenção, com expressa menção às condições gerais do empréstimo, inclusive ao compromisso, geral e antecipado, de dirimir por arbitramento tôdas as dúvidas e controvérsias;

- d) procuração designando o signatário do contrato, pela sociedade, caso não o façam os representantes legais da empresa.

III - Do Fiador:

1. O Brasil deverá ser o fiador do empréstimo. A Lei No. 4.457, de 6 de novembro de 1964, estendeu a autorização ao Poder Executivo para prestar a garantia do Tesouro Nacional, contida na Lei No. 1.518, de 24 de dezembro de 1951, a créditos obtidos no exterior, destinados a programas de saúde pública. A imensa melhoria de ordem sanitária que a execução do projeto trará à população beneficiada permite seja o mesmo classificado em tal categoria. A Lei No. 5.000, de 24 de maio de 1966, permite que a prestação da garantia, no caso de financiamentos concedidos por organismos internacionais de que o Brasil faça parte, seja outorgada diretamente pelo Ministro da Fazenda.

2. Antes da assinatura do contrato de fiança é necessário, entretanto, seja apresentado a este Banco comprovante da publicação do despacho do Ministro da Fazenda autorizando a prestação da garantia e indicando, se for o caso, seu representante na respectiva contratação. Tal despacho deverá mencionar as condições gerais da operação (finalidade, valor, prazo, juros e comissões) e permitir sejam aceitas, tendo em vista a autorização do artigo 23 da Lei No. 1.628, de 20 de junho de 1952, as cláusulas e condições usuais nas operações com organismos financiadores internacionais, inclusive o compromisso geral e antecipado de dirimir por arbitramento todas as dúvidas e controvérsias.

IV - Em Resumo:

Antes da contratação, deverão ser apresentados:

- a) Autorização da Assembléia Legislativa e do Senado Federal para que o Estado de São Paulo figure na mesma;
- b) decreto designando, se for o caso, o representante do Governo do Estado na assinatura do instrumento;
- c) publicação da ata da assembléia constitutiva da COMASP, de seus estatutos e da ata da assembléia que autorize a interveniência da COMASP;
- d) procuração designando, se for o caso, o signatário do instrumento em representação da COMASP;
- e) publicação do despacho do Ministro da Fazenda autorizando a prestação da garantia da União.

V - Dos Recursos Financeiros Locais:

1. A Lei No. 10.058, criadora da COMASP, dispõe, em seu art. 12, que o Poder Executivo Estadual fica autorizado a subscrever, além do capital social de cem milhões de cruzeiros novos, a quantia de até duzentos milhões de cruzeiros novos, em ações da sociedade.
2. Ademais, o art. 13 da mesma Lei manda abrir crédito especial de até noventa milhões de cruzeiros novos ao Departamento de Águas e Energia Elétrica (autarquia estadual) para que este, ainda no exercício de 1968, subcreva ações do capital inicial da COMASP.
3. A autorização legislativa mencionada nos parágrafos anteriores não especifica devam tais recursos serem aplicados apenas na execução do projeto para que se destina a operação ora em exame neste Banco. Em vista disso, concordou a administração estadual em enviar à Assembléia Legislativa projeto de lei 2/ que determina sejam incluídas, nos competentes orçamentos plurianuais e nas propostas de orçamento anuais, as dotações necessárias à efetivação da contribuição dos recursos locais para a execução do projeto e ao serviço da dívida correspondente aos empréstimos a serem concedidos. Desta maneira, pode-se afirmar que, caso seja a matéria aprovada pela Assembléia Legislativa e transformada em lei, estará, do ponto de vista jurídico, garantida, após a contratação dos empréstimos, a efetiva contribuição dos recursos financeiros locais.

2/ V. o Apêndice I, contendo o texto do projeto de lei referido.

LEI No. DE DE 1968

Autoriza o Poder Executivo a contratar operações de crédito com o Banco Interamericano de Desenvolvimento - BID, destinadas ao financiamento parcial das obras relativas ao projeto Juqueri, e dá outras providências.

O Governador do Estado de São Paulo:

Faço saber que a Assembléia Legislativa decreta e eu promulgo a seguinte lei:

Artigo 1.º - Fica o Poder Executivo autorizado a contrair empréstimos, junto ao Banco Interamericano de Desenvolvimento - BID, até o valor total de US\$17.000.000,00 (dezessete milhões de dólares), destinados ao financiamento parcial das obras do projeto Juqueri, que visam à produção de água potável para suprimento público das cidades incluídas na área da "Grande São Paulo".

§ único - Na contratação dos empréstimos referidos neste artigo o Poder Executivo poderá aceitar tôdas as cláusulas e condições usuais nas operações com organismos financiadores internacionais, inclusive o compromisso geral e antecipado de dirimir por arbitramento tôdas as dúvidas e controvérsias.

Artigo 2.º - A Companhia Metropolitana de Água de São Paulo - COMASP, criada pela Lei No. 10.058, de 7 de fevereiro de 1968, fica, na qualidade de agente financeiro do Estado para as operações referidas no artigo 1.º desta lei, investida dos poderes necessários ao desempenho das atribuições correspondentes, inclusive para representar o Estado em todos os atos relativos à execução dos respectivos contratos.

§ único - A COMASP receberá os recursos dos empréstimos, aplicando-os, diretamente, na execução do projeto, e contabilizando-os a crédito do Estado, para serem, oportunamente, empregados na integralização de ações a serem subscritas pelo Departamento de Águas e Energia Elétrica - DAEE, na forma dos artigos seguintes.

Artigo 3.º - O Poder Executivo, através o DAEE, proporá e votará, nas assembléias gerais de acionistas da COMASP, os aumentos de capital da sociedade que se fizerem necessários para dotá-la de todos os recursos financeiros indispensáveis à completa execução do projeto mencionado no art. 1.º desta lei.

Artigo 4.º - Para fins do disposto nos arts. 2.º e 3.º precedentes, o Poder Executivo, além das subscrições de ações autorizadas pela Lei No. 10.058, de 7 de fevereiro de 1968, subscreverá em aumento de capital da COMASP, através o Departamento de Águas e Energia Elétrica (DAEE), novas ações em montantes equivalentes:

I - ao valor dos empréstimos contratados, nos termos do art. 1.º desta lei;

II - a NCr\$153.867.000,00 (cento e cinquenta e três milhões oitocentos e sessenta e sete mil cruzeiros novos), em parcelas anuais distribuídas pelos seguintes exercícios:

1969 - NCr\$94.431.000,00

1970 - NCr\$57.159.000,00

1971 - NCr\$ 2.277.000,00

Artigo 5.º - A fim de ocorrer às despesas com a execução desta lei o Poder Executivo, além da correspondente inclusão nos orçamentos plurianuais de investimentos, fará constar das propostas de orçamentos anuais as seguintes dotações:

I - durante os exercícios de 1969, 1970 e 1971, as dotações necessárias a que o DAEE integralize as ações subscritas conforme previsto nesta lei;

II - durante os exercícios em que se processará a amortização dos empréstimos referidos no art. 1.º desta, as dotações necessárias a que a COMASP atenda ao serviço da correspondente dívida, inclusive juros e demais encargos contratuais.

Artigo 6.º - A presente lei entrará em vigor na data de sua publicação, revogadas as disposições em contrário.