

GEORGETOWN WATER SUPPLY AND SEWERAGE PROGRAM II

(GY-0054)

EXECUTIVE SUMMARY

Borrower:	The Co-operative Republic of Guyana (GOG)		
Guarantor:	The Co-operative Republic of Guyana		
Executing Agency:	Georgetown Sewerage and Water Commissioners (GS&WC)		
Amount and	IDB:	US\$27.0	million (FSO)
Source:	Local:	US\$ 3.0	million
	Total:	US\$30.0	million
Financial Terms and Conditions:	Amortization Period:	40 years	
	Grace Period:	10 years	
	Disbursement Period:	5 years	
	Interest Rate:	1% during grace period 2% thereafter	
	Supervision and Inspection:	1%	
	Credit Fee:	0.5%	
Objectives:	The program aims to improve the sanitary conditions of the population in Georgetown and reduce the current levels of environmental degradation through an improvement in the quality of the water supply and sewerage services. In order to achieve this goal referred above, the program has three objectives: (i) a further improvement in the availability and quality of potable water and the reliability of the distribution system; (ii) an improvement in the level of operation of the sewerage system; and (iii) the consolidation and further improvement of GS&WC as the operating agency.		
Description:	The program has three components, each one corresponding to one of the objectives referred above:		
	(i)	Further improvement in the availability and quality of potable water and the reliability of the distribution system , which consists of the construction of iron removal plants in two production centers (US\$1.9 million), the installation of water trunk mains (US\$ 0.8 million), the rehabilitation and sectorization of part of the distribution system (US\$5.9 million), and the installation of meters (US\$1.8 million).	

- (ii) **Improvement in the level of operation of the sewerage system**, which consists of the rehabilitation of the sewer system (US\$6.6 million), and the construction of a sludge pretreatment facility (US\$0.8 million).
- (iii) **Consolidation and further improvement of GS&WC as the operating agency**, which consists of the further strengthening of GS&WC capabilities through a contract with a Project Management Firm (PMF) (US\$3.5 million). The scope of activities of the PMF will be: (i) to assist GS&WC in the execution of the physical components of the program; (ii) to provide institutional strengthening to GS&WC; and (iii) to improve the financial situation of GS&WC by being responsible for the commercial aspects of the service. The compensation to be perceived by the PMF will be linked to the achievement of agreed benchmarks.

This program is the second stage of a long-term plan for the rehabilitation and expansion of the water supply and sewerage systems that began with the financing of a Master Plan (ATN/SF(JF)-3640-GY, approved in 1990 and completed in 1994) and the Remedial Maintenance for Georgetown Sewerage and Water Supply System (909/SF-GY, approved in 1993 and still in execution).

**Relationship of
Project in Bank's
Country and
Sector Strategy:**

The Bank's strategy for Guyana has been designed to promote growth and poverty reduction by addressing the country's principal development challenges. One of these challenges is the development of the social sector through the improvement in the delivery of education and health services, and also through programs for poverty reduction and improvement of urban living conditions.

The proposed program, scheduled in the Country Paper for 1999, is consistent with the country strategy. Also, the program pursues the same line of action established by its predecessor, by focusing on further improvements of the existing system, by trying to achieve and consolidate the financial sustainability of the service and finally by relying on the participation of an international, experienced firm.

**Environmental/
Social Review:**

The proposed program has a net positive environmental and social impact. The potential adverse impacts that are likely to arise are all of very low significance and generally temporary in nature. Most of them can be successfully mitigated through appropriate procedures, protocols and specifications for environmental management. To address potential impacts and maximize the benefits, the Environmental Assessment for the Master Plan prepared in 1995 was reviewed and a complementary environmental and social impact analysis was carried out as part of the feasibility studies of

the rehabilitation works. As a result of this analysis an ESIR was prepared and an Environmental Management Plan –EMP- was developed and included as part of the program. The EMP consists of mitigating measures, studies and monitoring activities designed to: (i) fill data gaps in the Master Plan to improve decisions in latter phases; and (ii) mitigate the negative, and accentuate the positive potential environmental and social impacts of the proposed works. The Environmental Assessment of the Master Plan was submitted to the Guyana Environmental Protection Agency in June 7, 1999 and the ESIR for the proposed program was made available for public review and comments in August 27, 1999.

Benefits:

The program will have important environmental and social benefits for the citizens of Georgetown. A greater number of Georgetown residents will have improved access to a dependable and safe potable water supply, thus improving the hygiene and reducing the incidence of illnesses and diseases caused by waterborne pathogens. Also, the rehabilitation of the water distribution system, combined with an effective public awareness and education program, will contribute to substantially reduce the volume of unaccounted-for water, that is currently lost to leakage, therefore reducing the demand for raw water. Finally, repaired and more efficient operation of existing sewerage system, rehabilitation of yard sewers, cleaning and efficient connections of septic tanks, and improved use of sanitary systems by homeowners and businesses (reductions in solid waste disposal and blockages, repair and correct function of indoor plumbing) should lead to improvements in household and municipal environmental health conditions.

Risks:

The main risk of the program is that, if the execution is focused on the physical components, the financial aspects might be relegated to a second level. In order to mitigate the risk, the following measures have been included: (i) the achievement of the financial sustainability pursued by the RMP is achieved during the first year of execution, and guaranteed by new tariff level and structure; (ii) the execution of the physical components will be carried out in stages, and the conditions necessary to access each one of the stages is that the financial sustainability achieved during the first year has been maintained; (iii) the program includes the participation of a PMF, whose retribution will be linked to performance indicators.

The participation of the PMF as part of the measures to ensure an adequate strengthening in institutional and financial aspects implies another risk: lack of interest on the side of potential bidders. In order to mitigate this, the selection of the operator will be done with the assistance of a specialized consultant. The Consultant will help GOG to prepare bidding documents, survey the interest of the market, and adjust the documents accordingly.

**Special
Contractual
Clauses:**

1. Conditions prior to first disbursement:

- a) The PMF has been hired by GS&WC (par. 3.1) and a technical professional in the PMF has been appointed to serve as coordinator for the Environmental Management Plan (par. 5.37).
- b) Special accounts for the disbursement of loan resources and local counterpart have been opened by GS&WC (par. 3.26).

2. Other conditions

- a) In order to authorize the execution of Stage 1, the final designs for the works included in this stage and the corresponding bidding documents would have been completed and approved by the Bank; the external auditors for GS&WC and the program have been hired; tariffs agreed with GOG during the preparation of the program are effective since January 1, 2000 (see par. 5.13); a list of contingency plans as presented in the ESIR (par. 5.37 b-i); and coverage of all operating costs, including depreciation, is at least 100% (par. 3.9).
- b) In order to authorize the execution of Stage 2, the final designs for the works included in this stage and the corresponding bidding documents would have been completed and approved by the Bank; tariffs agreed with GOG during the preparation of the program are being implemented (see par. 5.13); and coverage of all operating costs, including depreciation, is at least 104%. (par. 3.10).
- c) In order to authorize the execution of Stage 3, the final designs for the works included in this stage and the corresponding bidding documents would have been completed and approved by the Bank; tariffs agreed with GOG during the preparation of the program are being implemented (see par. 5.13); and coverage of all operating costs, including depreciation, is at least 115%. (par. 3.11).
- d) Within 120 days of the end of each fiscal year, audited financial statements of the program and GS&WC will be submitted to the Bank (par. 3.27).
- e) Prior to approving documents for construction contracts, the Borrower shall provide evidence, to Bank's satisfaction, that:
 - The environmental management guidelines, as defined in the ESIR and incorporated into the technical specifications for construction and rehabilitation works, prepared with the final designs, have been included in the bidding documents, as well as the applicable contractual clauses to ensure compliance by contractors;

- The project works are in compliance with all applicable environmental regulations under the Environmental Protection Act, as required by the environmental authority.

f) GS&WC, through its PMF, shall present annual progress reports in which advances and delays in implementation of the EMP are discussed, and any significant results evaluated for each activity under the Plan (par. 5.37).

Poverty-Targeting and Social Sector Classification: This operation qualifies as a social equity-enhancing project, as described in the indicative targets mandated by the Bank's Eighth Replenishment (Document AB-1704). Furthermore, this operation qualifies as Poverty Targeted Investment (par. 5.30) by the geographic criterion. The borrower has requested and additional 10% in Bank financing allowed for Poverty Targeted Investment operations.

Procurement: The procurement of goods and works and contracting of consulting services will be carried out in accordance with the current Bank policy as reflected in Annexes B and C of the Loan Contract. International competitive bidding will be required for purchases of US\$250,000 and higher in the case of goods and related services, and US\$1,500,000 in the case of construction works. The bidding of amounts below these ceilings will take place in accordance to the local legislation.

The PMF will be selected through a competitive bidding process. The qualifications of the PMF will be of a water and sewerage utility with experience in the implementation of investment plans like the one involved in this program, or an engineering firm with experience in the operation of water and sewerage systems.

Exceptions to Bank Policy: The selection of the PMF will be carried out in two phases: pre-qualification of firms and submission of economic proposals. The contract will be awarded to the lower bidder among the firms that were previously pre-qualified. Although this is a common practice in the procurement of these kinds of services in order to ensure a suitable firm at a lower price, the awarding of the contract based on price is an exception to the Bank's procurement policy.

I. FRAME OF REFERENCE

A. Macroeconomic context

- 1.1 Following nearly two decades of economic decline, Guyana embarked in 1989 on an Economic Recovery Program that was supported by World Bank Structural Adjustment programs and the International Monetary Fund (IMF)'s Enhanced Structural Adjustment Facility (ESAF). As a result of this program, inflation declined from its peak of 101.5% in 1991 to 3.6% by 1997 and the economy achieved a remarkable compound growth rate of about 7% annually between 1990 and 1997 with gold, sugar, rice and forestry as the leading industries. Overall public sector deficit decreased from 30% of GDP in 1991 to 8.8% of GDP in 1997.
- 1.2 However, Guyana experienced in 1998 its first recession in seven years, with a decline of GDP of 1.5%. The contraction was driven by the adverse impact of rainfall deficiency associated with the El Niño phenomenon and as well as the declining commodity prices, which affected the real value of production and export receipts from sugar, rice, gold, timber and bauxite.
- 1.3 Macroeconomic policy in 1998 was dominated by the need to recover from the still high public sector deficit of 1997. In July 1998, the Government of Guyana reached agreement with the IMF on the policy framework for a new ESAF arrangement to cover the 1998-2001 period. Compliance with the policy conditions of the new ESAF agreement is a precondition for debt relief under the Heavily Indebted Poor Countries (HIPIC) initiative. In the context of this macroeconomic program, the public sector deficit fell back to 5.1% of GDP in 1998, although this reduction fell short of the budgeted 2% due to weak revenue collection and expenditure control.
- 1.4 Guyana's economic growth is expected to resume but at lower rates than in the past. Real GDP growth of only 1.8% is expected in 1999 as a result of continuing difficulties in the external and domestic environment. Public sector deficit (including grants and HIPIC relief) is expected to decrease to 3% of GDP in 1999. Debt relief under HIPIC Initiative –which amounts to about 4% of GDP- would release much needed budgetary resources to promote economic and social progress, and Government placed emphasis on increasing those resources for the social sectors and improvement of civil service compensation.

B. The water and sewerage services in Guyana

1. Overview

- 1.5 Guyana has a population of approximately 750,000 inhabitants, 80% of which live along the coastal plain. Only six towns, with a combined estimated population of 254,400, are formally designated as urban municipalities. The largest urban center is Georgetown, the capital, with approximately 178,000 inhabitants.
- 1.6 The word Guyana derives from the Amerindian "Guiana" which means "land of many waters". That is, an annual rainfall of about 60 to 140 inches per year supports four large river systems, numerous small rivers and two large groundwater aquifers. As a result of this, it is estimated that about 95% of Guyana's population have access to fresh water. However, water availability does

not ensure service quality. Water supply is deficient in terms of distribution and public sewerage system only exists in the inner area of Georgetown.

2. Institutional and legal framework

- 1.7 The current legislative framework establishes the provision of water and sewerage services in Guyana through two institutions: the Georgetown Sewerage and Water Commissioners (GS&WC) and the Guyana Water Authority (GUYWA), both under the policy direction of the Ministry of Water and Housing.
- 1.8 The recognition of the special status of Georgetown as the capital city with particular problems and issues has resulted in a history of formal structures and responsibilities for the provision of water services and drainage including the disposal of wastewater. The Georgetown Sewerage and Water Act 1929, which repealed earlier legislation, established a corporate body of commissioners with the statutory duties of operation, maintenance and management of sewerage systems and waterworks. Subsequent amendments of such legislation derived to the Georgetown Sewerage and Water (Amendment) Act 1994, which established GS&WC as an autonomous agency responsible for the provision of water supply and sewerage services in Georgetown.
- 1.9 GUYWA was established in 1972 by the Guyana Water Authority Act as a corporate body with the exclusive right to provide sewage and water services in those areas which then had those services provided through the Ministry of Works, Hydraulics and Supply, or where no such services were being supplied by any statutory authority. By virtue of section 11 of the Georgetown Sewerage and Water (Amendment) Act 1994, GUYWA has no authority whatsoever over GS&WC.
- 1.10 The characteristics of the areas served by both utilities as well as their levels of performance are quite different, as presented in the table below. Basically, GS&WC provides services to Georgetown exclusively, whereas GUYWA is focused on rural systems. Also, whilst GS&WC is struggling to achieve financial sustainability, cost recovery in GUYWA is practically nonexistent.

Table 1.1
Providers of Service in the Water Sector

INDICATOR	GS&WC	GUYWA
Number of Customers	28,000	90,000
Inhabitants in larger urban area served	178,000	33,500
Monthly bill for typical domestic customer (USD)	3.5	0.6
Coverage of O&M costs with revenues (%)	66%	9%
Collections as a percentage of revenues	77%	N/A

- 1.11 As for the regulatory framework, there is a Public Utilities Commission in charge of specific regulatory functions in respect of public utilities, but water and sanitation is currently out of its scope of activities. Therefore, the sector currently

lacks an effective agency for the monitoring of areas such as water and wastewater quality standards, customer service standards and financial performance. GOG is currently embarked in a series of studies to set an adequate institutional framework for the sector (see par. 1.36 and 1.43 below).

C. The water supply and sewerage services in Georgetown

1. Brief description of the systems

- 1.12 Potable water is supplied to Georgetown through two different sources. The East Demerara Water Conservancy (EDWC) -a watershed built in 1877 that covers 333 km² and has a catchment area of 520 km²- supplies 42% of the city needs via the 14 km long Lamaha Canal. Raw water from the EDWC is treated at the Shelter Belt treatment plant, which was constructed in two phases in 1951 and 1956. The remaining 58% is pumped from 17 wells located within the urban area. The total amount of water supplied to the system is about 105,000 m³/day.
- 1.13 The water supply distribution system dates from 1867, and has been progressively extended since that time to serve all developed areas within the city with the exception of the squatter settlements. Today, the system directly serves, through individual connections, approximately 88% of the population. The majority of households without connection lives in squatter areas and collects water from neighboring standpipes or the public distribution network.
- 1.14 About a third of Georgetown households are served by a conventional mains sewerage system constructed between 1924 and 1929. The system consists of 24 sewerage basins each draining to a dedicated pumping station and the sewers largely remains unaltered since construction. The sewerage system discharges to a common ring force main, which in turn discharges untreated sewage through two short outfalls at the sea and the mouth of Demerara River. As for the rest of households, septic tanks or pit latrines are used and the effluent is discharged into drainage ditches, which in turn drain to the Demerara River or the sea.

2. The Georgetown Sewerage and Water Commissioners

- 1.15 The provision of water supply and sewerage services in Georgetown is under the responsibility of GS&WC. The agency has about 28,000 registered customers, of which approximately 9,500 have sewerage service. With the support of the Bank, there has been some improvement in GS&WC's technical and institutional capabilities in the past few years. The financial situation of GS&WC has also improved, with collections increasing from US\$0.7 million in 1992 to US\$1.4 million in 1998.

3. Main problems of the service

- 1.16 Due to the proliferation of algae and decomposition of organic matter in the EDWC, surface water arrives to the treatment plant with a high content of color, which is difficult to remove. In order to dilute the color and therefore improve the quality of the water supplied to the customers, surface water is mixed with ground water, which has no color but instead high concentrations of iron. None of these factors -color and iron- poses a risk to the public health. However, presence of color is an aesthetic problem and iron can cause the plugging small diameter pipes and water meters.

- 1.17 Surveys of the distribution system indicate that pipes are in a poor condition due to internal incrustation, breakage and corrosion. As a result of this, the performance of the water distribution system needs to be improved in terms of increasing pressure and specially reducing physical loses. Due to the low pressures, many households are forced to carry water into the home from standpipes in the yard or directly from the mains. Also, low or negative system pressure compromises water quality by making possible the ingress of dirty water into the pipes through cracks. Physical leakage in the distribution system and wastage of water is estimated at 70% of production.
- 1.18 The main problems reported for the sewerage system are poor condition and frequent blockages of sewers, and discontinuous operation of the pumping stations due to mechanical and electrical problems, which leads to overflows of wastewater into the drainage canals. Raw sewage is discharged with no treatment at all into the Demerara River and the sea.
- 1.19 From the institutional and financial point of view, GS&WC has the necessary authority to impose charges to cover the costs of the services. However, due to lack of enforcement of the existing legislation about this aspect, cost recovery is low, which poses a risk to the sustainability of the improvements achieved in the past as well as the adequate provision of the service. As a result, GS&WC is still dependable on subventions from Government.

D. Bank and other donors activity in the sector

1. The involvement of the Bank in GS&WC

a) Overview

- 1.20 In 1990 the Bank approved a technical cooperation to finance the Georgetown Water and Sewerage Master Plan. The Master Plan was completed in 1994 and has to be regarded as the general framework for any operation to improve the water supply and sewerage systems in Georgetown.
- 1.21 While the Master Plan was being prepared, the Bank approved in 1993 the loan 909/SF-GY to finance the Remedial Maintenance for Georgetown Sewerage and Water Supply System (RMP). The main objective of this project was to effect a rapid and observable improvement in water availability and quality, to revamp GS&WC to establish an autonomous operating company, to implement a new tariff structure to ensure financial viability, and finally to encourage water conservation.
- 1.22 The financial situation of the service, as described in the loan proposal, was such that tariff revenues in 1993 were expected to cover only 43% of expenditures. Because of the poor quality of the service provided, tariffs could not be increased and so the program could not meet the policy requirements in order to qualify for Bank lending. To break this deadlock, a one-time exception was allowed in the understanding that the RMP could improve the service and tariffs could cover operating, maintenance and depreciation costs within a reasonable period of time. Accordingly, targets for cost coverage and collections were established in the loan contract.
- 1.23 Following the loan proposal guidelines, a project management firm (PMF) -a consortium led by HARZA Engineering Company- was selected by the borrower to

assist GS&WC implement the project. According to the provisions set forth in its terms of reference, the PMF was given a high degree of freedom to refine the activities included in the RMP. Although the work plan prepared by HARZA maintained the same approach of the loan proposal, the works finally carried out shifted the focus of the project. That is, instead of the rehabilitation of the distribution system in specific areas of the city, a general improvement of the trunk mains system was undertaken. This change was justified with the need of improving the general performance of the system before specific areas could be rehabilitated.

b) Current status and achievements of the RMP

- 1.24 The RMP is still under execution, with disbursements at 74% and all available funds practically committed. Last disbursement is scheduled for June 30, 2000. At this point, the level of achievement for each of the objectives mentioned above is the following:

i) Water availability and quality

- 1.25 The volume of water produced has increased from 90,000 to 105,000 m³/day due to the rehabilitation of the Shelter Belt treatment plant and ground production sites, and the construction of two new wells. Also, the same rehabilitation works have contributed to improve the quality of the water supplied to the customers. Works in the transmission system were undertaken in order to increase pressures and improve their distribution. However, average pressures are still below the 15 psi recommended in the loan proposal. Due to the above-mentioned change of focus in the works originally proposed, little has been done in the rehabilitation of the distribution system and physical losses are still about 70% of production. In order to put the RMP into the proper perspective, the works carried out represent only a 6% of the investments proposed in the Master Plan for the full rehabilitation and expansion of the systems.
- 1.26 The situation of water availability as perceived by customers has remained virtually the same as in 1993, with only 9% of households occupying the first and higher floors receiving water directly into their dwellings from the system. However, the percentage of households with private pumps has increased from 11% to 24%, which reflects both the increase in production and the improvement of the economic situation. As a result of this, the percentage of households occupying the first or higher floors that need to carry water into their dwelling have declined significantly from 76% to 57%.

ii) Institutional strengthening of GS&WC

- 1.27 As a result of the RMP, GS&WC has been established as a legally autonomous entity by provisions of the Georgetown Sewerage and Water (Amendment) Act of 1994. However, in practice GS&WC will not make some decisions like tariff increases without a previous approval by Cabinet. A new organizational structure and salary scale has been implemented and personnel have been reduced from over 400 in 1995 to 243 at the end of 1998. In term of management systems, a general accounting system is operational and producing periodic financial statements, but the new billing software has not been installed yet.

iii) Financial sustainability

- 1.28 The agency is still financially dependable on subventions from the central government, and tariff¹ and collection² clauses in the loan contract are not complied with. This fact was pointed out during the Mid-term review, and it was agreed that GS&WC would review existing tariff level in order to release the funds for the second phase of the program. The Bank approved the new tariff adopted by GW&WC and authorization for use of Bank resources was released again. However the new tariff was never implemented. Adequate measures to increase revenues and cover operation, maintenance and depreciation costs in the year 2000 have been agreed as a result of the preparation of this program. Compliance with these measures would be monitored and enforced prior to first disbursement and during the execution of the program. Sections IV and V of this document address this issue of financial sustainability with more detail.

iv) Water conservation

- 1.29 Bulk meters have been installed in the production sites and 90% of non-residential customers are metered. Metering of residential customers, as required in the project for customers in rehabilitated areas, has been limited so far to a residential consumption survey of 500 customers. However, two contracts for the purchase and installation of 6,000 meters have already been awarded and works are expected to begin immediately.
- 1.30 Wastage of water is still significant, with 30% of households interviewed during the preparation of this new program reporting to leave the taps on at least occasionally. The reason for this behavior is to allow discolored water to run, to ensure than storage containers are filled, or simply to know when water comes back. Implementation of the metering program is expected to reduce wastage.

c) Evaluation of the RMP

- 1.31 As part of the preparation the new program, the Bank hired a consulting firm to conduct an evaluation of the ongoing RMP. The conclusions of this evaluation can be summarized as follows:
- a. The objectives of the program might have been too ambitious for the amount of resources allocated and the precarious situation of the system. Also, the abandonment, of the zonal approach and subsequent replacement by a citywide repair contributed to increase the number of beneficiaries but lowered the impact of the benefit for each average beneficiary. This affected the chances of turning benefits into additional revenues.
 - b. An important effort was made in establishing GS&WC as an autonomous operating agency. From the institutional point of view, there have been significant changes in GS&WC organizational structure. The current level of salaries, although higher than for other public sector agencies, is still lower than the private sector and this poses some difficulties in attracting qualified personnel. From the financial point of view, improvement in the commercial area, in terms of tariffs, customer registry, billing and collection, have been so

¹ The loan contract requires coverage of all operating expenses, including depreciation.

² The loan contract requires a collection rate of 85% in rehabilitated areas and 75% in non-rehabilitated areas.

far very limited. Again, this delay has had effects in the financial situation of GS&WC.

- c. On the one hand, the existence of PMF firm made a difference in terms of executing the physical components of the RMP within a certain period of time, as opposed to the much significant delays experienced by other projects in Guyana. On the other, the PMF was not held responsible enough in its terms of reference in the improvement of GS&WC performance.

2. The involvement of the World Bank in GUYWA

- 1.32 In 1993, the World Bank approved the Water Supply Technical Assistance and Rehabilitation Project. The objectives of this project were to improve the quality and reliability of potable water in selected regions in Guyana and to enhance the efficiency of water sector institutions. In order to achieve those objectives, the project included rehabilitation of some 45 major and 100 minor systems, operation and maintenance routine programs, human resources development and institutional strengthening of GUYWA. Given the involvement of the Bank in GS&WC, Georgetown was explicitly excluded from the project.
- 1.33 Although the World Bank project had similar scope and objectives for GUYWA than the RMP for GS&WC, the results have been completely different especially in the institutional and financial aspects. After some consideration about if disbursements had to be stopped, the project was restructured in May 1999. Remaining funds have been focused on the general improvement of the transmission lines. Any improvement in the institutional or financial side has been postponed for an eventual future operation still to be agreed and defined.
- 1.34 The World Bank is also implementing an Emergency Project to mitigate the effects of El Niño in Guyana, which includes the rehabilitation of the distribution system in a small area of Georgetown.

3. Other donors activity

- 1.35 Other donors have also been involved in the sector, either by themselves or sometimes as part of broader arrangements with multilateral institutions. When acting by themselves, most of their involvement consists of donations of parts or equipment and also the construction of specific facilities.
- 1.36 Among these donors, the Department for International Development (DFID) is taking an increasing role in the planning of the sector through three studies that are scheduled to be completed by the end of 1999. The first one is a technical assistance for the development of a national water policy, proposals for a national water council, and adequate regulatory framework. The second one is a long-term strategic plan for GUYWA, which will cover required investments, quality standards and an appropriate path of tariff adjustments to achieve progressive higher levels of cost recovery. The third one is an assessment of benefits and costs of a possible merger between GUYWA and GS&WC and, provided that benefits exceed costs, set out an implementation plan. The studies have been awarded to KGPM, which will work with a team of specialists from Halcrow, London Economics and Northumbrian Water Authority, among others.

4. Lessons learned

- 1.37 A great amount of investment is needed to rehabilitate and expand the water supply and sanitation systems in Guyana. Consequently, from the technical point of view, is relatively easy to identify different alternatives for the allocation of available funds, all of them being feasible and desirable. However, given the scarcity of funds, decisions cannot be made based on technical criteria only. Instead, a business-like approach is necessary to allocate those funds in areas that help generate new funds and this way speed-up the upgrading and expansion of the systems. The zonal approach of the RMP was based on this concept.
- 1.38 In a situation like this, projects have to include a strong incentive to ensure that decisions made during execution maintain the equilibrium between physical and institutional components. This is specially important when the institutional components imply actions that may represent a political cost in the short term, like an increase of monthly charges or the enforcement of collection.

E. IDB strategy and rationale for involvement

- 1.39 The Bank's strategy for Guyana has been designed to promote growth and poverty reduction by addressing the country's principal development challenges. One of these challenges is the development of the social sector through the improvement in the delivery of education and health services, and also through programs for poverty reduction and improvement of urban living conditions. The Bank is currently contributing to these goals through the ongoing programs and the proposed pipeline of projects, which concentrates on the strengthening of the institutional capacity of the public agencies responsible for the provision of services, and the rehabilitation of infrastructure, rather than new construction.
- 1.40 The proposed Georgetown Water Supply and Sewerage Rehabilitation Program II, scheduled in the Country Paper for 1999, is consistent with the country strategy. The proposed program pursues the same line of action established by its predecessor, by focusing on further improvements of the existing system, by trying to achieve and consolidate the financial sustainability of the service and finally by relying on the participation of an international, experienced firm. The achievement of GS&WC financial sustainability will contribute to reduce the public sector deficit and is therefore consistent with the GOG's macroeconomic policy. Lessons learned from the RMP are being taken into account by developing and adequate incentive system to foster efficiency in the provision of the services.

F. The proposed program

1. The program within the context of a long-term plan

- 1.41 The proposed program is the second stage in the gradual improvement of the water supply and sewerage services in Georgetown through a new package of investments within the context of the Master Plan. That is, the RMP focused on the rehabilitation of production sites and main distribution lines, whereas the new program aims to the rehabilitation of part of the distribution system as well as the sewerage system.
- 1.42 From the institutional and financial point of view, the RMP established GS&WC as the operating agency and set the basis for its financial sustainability, whereas the

new program is going to consolidate the achievements of the RMP and reinforce the critical areas of commercialization of the service and reduction of unaccounted-for water.

2. The program within the context of the sector policy

- 1.43 The proposed program has to be regarded in the context of a precarious sector structure. Two agencies operate in the sector, GS&WC and GUYWA, and no policy or regulatory agency has been formally established. As for the tariff-setting mechanism, the agencies have the necessary legal authority to impose tariffs but these provisions have not been enforced partly because of the lack of a regulatory entity. In this context, GOG is committed to the rationalization of available resources in the sector, the quality of the services and an adequate level of cost recovery, for which the assistance of DFID was requested in the form of the three studies referred above.
- 1.44 The Bank's contribution to the sector so far has been the establishment of GS&WC as one of the operating agencies. In the next few months, the Bank is going to participate in the discussion of the interim reports and final draft of the DFID studies in order to ensure that the principles of the Public Utilities Policy are followed and that the final actions are compatible with the objectives of the program.

II. THE PROGRAM

A. Goal

- 2.1 The program aims to improve the sanitary conditions of the population in Georgetown and reduce the current levels of environmental degradation through an improvement in the quality of the water supply and sewerage services.

B. General objectives

- 2.2 In order to achieve the goal referred above, the program has three objectives: (i) a further improvement in the availability and quality of potable water and the reliability of the distribution system; (ii) an improvement in the level of operation of the sewerage system; and (iii) the consolidation and further improvement of GS&WC as the operating agency.
- 2.3 The first objective will be achieved through a series of actions to reduce physical losses, commercial losses and wastage, as well as the installation of trunk mains to improve the distribution of water throughout the system. Also, two iron removal plants will improve the quality of the water produced. The second objective implies a full rehabilitation of the sewerage system. Finally, in order to take full advantage of the potential effect of the investment components of the program in the quality of the service, special emphasis will be placed in the administration and operation of the system. The program intends to involve a PMF to achieve a further improvement in these areas, as well as specific targets in the commercialization of the service and the reduction of unaccounted-for water.

C. Program description

- 2.4 The program consists of three components, each one corresponding to one of the objectives referred above.

1. Further improvement in the availability and quality of potable water and the reliability of the distribution system

- 2.5 **Construction of iron removal plants (US\$1.9 million):** This sub-component will finance the construction of iron removal facilities at two of the ground production sites (Central Ruimveldt and Sophia), which supply water to five of the fifteen zones of the city. Each of the sites will be provided with two aeration and clarification units with a combined capacity to treat 38% of the water currently produced from the A Sands Aquifer. The effect of the activities included in this sub-component will be an improvement in the quality of the water supplied to the customers.
- 2.6 **Installation of water trunk mains (US\$0.8 million):** The sub-component will finance the installation of 7564 m of trunk mains of 6, 8 and 16 inches of diameters in order to improve the connection of the main system to two zones of the city that currently are relatively isolated and served with individual wells. This work will complete the rehabilitation of the trunk mains system that was already initiated under the RMP. The effect of the activities included in this sub-component will be a better distribution of available water among the different zones of the city and especially to those areas located away from the various production sites.

2.7 **Rehabilitation and sectorization of the distribution system (US\$5.9 million):** This sub-component will finance the replacement and sectorization of the distribution network in four of the zones benefiting from the new iron removal plants. In particular, this sub-component includes replacement of pipes and installation of valves, fire hydrants, valve boxes, house service connections and related fittings. Zones not rehabilitated at this time will also be separated and isolated through the installation of valves. Finally, flow meters and pressure gauges will be installed in the inflow and outflow points of each zone in order to monitor flows. The effects of this activity will be a control and a reduction of the current levels of unaccounted-for-water and a better operation of the system.

2.8 **Installation of meters (US\$1.8 million):** This sub-component will finance the purchase and installation of 16,800 meters in nine zones of the city. Meters will be installed in accordance with the conditions of the service in terms of iron concentration in the water and residual pressure at the customers' connection. Areas served by the Shelter Belt Plant, areas served by existing B Sands wells and areas to be served by the proposed treatment facilities are expected to experience water supplies with low iron concentrations (less than 0.5 mg/l). Any area served by these facilities that experience pressures greater than 10 psi will therefore be suitable for metering. The effect of the activities included in this sub-component will be a reduction of current level of commercial losses as well as a reduction of water wastage.

2. Improvement in the level of operation of the sewerage system

2.9 **Rehabilitation of the sewer system (US\$6.6 million):** This sub-component will finance the cleaning, repair and replacement of yard and street sewers. Also, this sub-component will finance major refurbishment and reconditioning of the pump stations, which a modified design to settle the grit and grind the solids in order to minimize the damage to the pumps. This sub-component will also finance the rehabilitation and extension of the existing outfall in order to ensure an adequate disposal of discharge from the sewerage system. The effect of the activities included in this sub-component will be a better operation of the sewerage system with reduction of blockages and also failures in pump stations.

2.10 **Construction of a sludge pretreatment facility (US\$0.8 million):** This sub-component will finance the construction of a sludge pretreatment facility, which will receive the sludge from the septic tanks. The sludge pretreatment facility will consist of a dumping station to receive the tanker trucks, a bar screen to separate the solids, a grit removal chamber, a two-day storage facility and a pumping station to pump the resulting wastewater into the sewage system. The effect of the activities included in this sub-component will be a better disposal of the sludge coming from septic tanks, which are currently being discharged in drainage ditches or sewage pump stations.

3. Consolidation and further improvement of GS&WC as the operating agency

2.11 **Assistance of a Project Management Firm (US\$3.5 million):** This sub-component will finance the strengthening of GS&WC's administrative and operational capabilities through a PMF. The scope of activities of the PMF will be: (i) to assist GS&WC in the execution of the physical components of the program;

(ii) to provide institutional strengthening to GS&WC; and (iii) to improve the financial situation of GS&WC by being responsible for the commercial aspects of the service. The compensation to be perceived by the PMF will be linked to the achievement of agreed benchmarks. Section III of this document presents further detail of this scope of activities as well as the contractual arrangements between GS&WC and the PMF. The effects of the activities included in this sub-component will be a timely execution of the program and an increased capacity of GS&WC to administrate and operate the systems.

D. Environmental assessment and management

- 2.12 An Environmental Assessment (EA) was prepared in 1995 as part of the Georgetown Water and Sewerage Master Plan, which evaluated the alternatives for both the longer term program of improvement works and its first stage that were proposed in the Master Plan. During the preparation of the program, the EA for the Master Plan was reviewed and a complementary environmental and social impact analysis was carried out.
- 2.13 The potential adverse impacts that are likely to arise are all of very low significance and generally temporary in nature. Most can be successfully mitigated through appropriate procedures, protocols and specifications for environmental management. As a result of the analysis, an Environmental Management Plan (EMP) was developed and incorporated in the program. The EMP consists of mitigating measures, studies and monitoring activities designed to: (i) fill data gaps in the Master Plan, which is necessary to analyze the potential environmental impacts of water supply and sewerage works to be implemented in latter phases; and (ii) mitigate the negative, and accentuate the positive potential environmental and social impacts of the proposed works. The total cost of the EMP is US\$275,250.
- 2.14 The EA of the Master Plan was presented to the Guyana Environmental Protection Agency (EPA) in June 7, 1999 and the ESIR for the proposed program was made available to the public in August 27, 1999 in order to elicit and consider relevant comments. Based on the review of the documents the EPA will grant an environmental permit for the works included in the Program.

E. Program cost and financing

- 2.15 The total cost of the program is estimated at US\$30.0 million equivalent of which the Bank will finance up to US\$27 million equivalent or 90% of the total cost. In addition to the Bank's financing, the Ministry of Housing and Water will provide the local counterpart of US\$3.0 million equivalent, or the remaining 10% of the total cost. The following table presents a breakdown of estimated costs by investment categories and source of financing.

Table 2.1
Program Cost and Financing Table (US\$000)

CATEGORIES	TOTAL IDB	TOTAL GOG	TOTAL	%TOTAL
I. ENGINEERING & ADMINISTRATION	4,000	0	4,000	13%
1.1 Project Management Firm	3,500	0	3,500	12%
1.2 Final designs	500	0	500	1%
II. DIRECT COST	15,745	2,040	17,785	60%
2.1 Construction of iron removal plants	1,060	840	1,900	6%
2.2 Rehabilitation and Sectorization of the Distribution system	5,935	0	5,935	20%
2.3 Installation of Meters	1,770	0	1,770	6%
2.4 Installation of Water Trunk Mains	0	820	820	3%
2.5 Rehabilitation of the Sewer System	6,180	380	6,560	22%
2.6 Construction of a Sludge Pretreatment Facility	800	0	800	3%
III. CONCURRENT COST	575	0	575	2%
3.1 External Auditor	300	0	300	1%
3.2 Environmental Management Plan	275	0	275	1%
IV. UNALLOCATED	5,754	615	6,369	21%
4.1 Contingencies	3,048	306	3,354	11%
4.2 Escalation	2,706	308	3,014	10%
V. FINANCIAL COSTS	926	345	1,271	4%
5.1 Interest	656	0	656	2%
5.2 Credit Commission	0	345	345	1%
5.3 Inspection fee	270	0	270	1%
TOTAL	27,000	3,000	30,000	100%
%	90%	10%	100%	

1. Engineering and administration

- 2.16 This category accounts for approximately 13% of the total cost of the program and will finance assistance to GS&WC by a new PMF and the final designs for the works to be initiated in the third and successive years of execution. The final design for the works to begin in the first two years are not included here since they are being financed through a non-reimbursable Technical Cooperation.

2. Direct costs

- 2.17 This category accounts for approximately 60% of the total cost of the program and will finance the supply of goods and construction for the different physical works in the water supply and sewerage systems.

3. Concurrent costs

- 2.18 This category accounts for approximately 2% of the total cost of the program and will finance the EMP and an external auditing firm that will review the annual financial statements of GS&WC and the program as well as the compliance with the different conditions and benchmarks that have been established.

4. Unallocated

- 2.19 This category accounts for approximately 21% of the total cost of the program and consists of contingencies and cost escalation. Provisions for contingencies have been estimated as 15% of engineering & administration, concurrent costs and direct costs. Escalation has been calculated using a differential of 4% between internal and external inflation.

5. Financial costs

- 2.20 This category accounts for 4% of the total cost of the program and consists of (i) the interest on the proposed loan during the execution period; (ii) the sums payable as credit commission; and (iii) the cost of inspection and supervision by the Bank.

F. Financing plan

1. Bank financing

- 2.21 The Bank financing, in the amount of US\$27 million, will be drawn from the Fund for Special Operations (FSO). The terms and conditions of the loan are presented in the following table:

Table 2.2
Terms and Conditions of the Loan

Source of funds:	Fund for Special Operations
Amount of loan:	US\$27 millions
Terms:	
Amortization period:	40 years
Grace period:	10 years
Disbursement period:	5 years
Interest rate:	1% first 10 years
	2% remaining years
Inspection and supervision:	1% of the amount of the loan
Credit fee:	0.5% of the undisbursed balance

2. Counterpart funding

- 2.22 The local counterpart, in the amount of US\$3.0 million, will be provided by the Ministry of Housing and Water and will be distributed over a period of execution of five years.

III. PROGRAM EXECUTION

A. The executing agency and the PMF

- 3.1 The program will be executed by GS&WC, which will be assisted by a PMF. The role of the PMF will be to provide assistance to GS&WC in the following activities: (i) execution of the physical components of the program; (ii) institutional strengthening; and (iii) improvement of the financial situation of the service. Basically, the PMF will focus on improving the sustainability of the services, with the help of the physical components of the Program. Paragraph 3.15 below, addresses the PMF's role and responsibility with more detail. **Hiring of the PMF will be a condition prior to first disbursement.**
- 3.2 The execution of the physical components of the program implies for the PMF the preparation of tender documents, the management of tender processes, the preparation of bid evaluation reports, the supervision of contractors, and the assistance to GS&WC in the general administration of the program and the preparation of requests for disbursements and financial statements.
- 3.3 The institutional strengthening of GS&WC will imply for the PMF the implementation of studies included in the program, the development and implementation of on-site training programs and the transfer of technology to GS&WC staff to improve the daily operation, maintenance and administration of the systems.
- 3.4 Additionally, there will be two areas in which the role of the PMF will change from the provision of support to full responsibility. These areas, with direct impact in the improvement of the financial situation of the service, are the reduction of physical losses in the system and the commercialization of the service.

B. Project execution

- 3.5 The construction of works and the provision of services will be undertaken by international or local private sector contractors. In the case of works, the bidding will be for the supply and installation, so contractors will be expected to provide pipes, valves, connections, meters and specialized tools and equipment as well as labor and normal excavation equipment.

C. Implementation schedule

1. Overview

- 3.6 As it was mention in Section I when reviewing the lessons learnt from other operations in Guyana, the great amount of investment needed in the sector and the sensitivity of the population to any increase in charges poses a risk of focusing available funds to merely physical works and postponing for future stages any linkage between improvements in service and cost recovery. A long-term approach, though, requires to strengthen the cost recovery capabilities of the service from the very beginning in order to generate additional funds that will contribute to speed-up the rehabilitation and expansion of the systems.
- 3.7 In order to ensure the adequate equilibrium between physical investments and efforts to improve the financial situation of the service, loan resources for the execution of the physical components of the program will be approved in three stages. The approval for the execution of each stage will be conditioned upon the

fulfillment of certain obligations and the achievement of certain levels of efficiency, as explained with further detail below.

2. Stages of investment

- 3.8 The following table summarizes how the physical components of the program have been divided into stages. The idea behind each stage is to gather a package of works that will permit to improve the level of service significantly in a specific area of the city. This improvement will allow GS&WC to increase revenues and collections and therefore its level of cost recovery.

Table 3.1
Stages of Investment

SUB-COMPONENT	STAGE 1	STAGE 2	STAGE 3
Construction of iron removal plants (US\$1,910,000)	Iron removal plant in Central Ruimveldt (US\$960,000)	Iron removal plant in Sophia (US\$940,000)	
Installation of water trunk mains (US\$ 820,000)		Installation of water trunk mains (US\$820,000)	
Rehabilitation and sectorization of the distribution systems (US\$5,935,000)	Rehabilitation and sectorization of zones W1, W2, and W4 (US\$4,080,000)	Rehabilitation of zone W14 (US\$1,455,000) Sectorization of remaining zones (US\$400,000)	
Installation of meters (US\$1,770,000)	Metering of zones W1, W2 and W4 (US\$570,000)	Metering of zones W14, W3, W7, W8, W12, and W13 (US\$1,200,000)	
Rehabilitation of the sewer system (US\$6,560,000)	Rehabilitation of sewerage pump stations and outfall. (US\$2,600,000)		Rehabilitation of yard and street sewers (US\$3,960,000)
Construction of a sludge pretreatment facility (US\$800,000)			Construction of a sludge pretreatment facility (US\$800,000)
TOTAL	US\$8,210,000	US\$4,815,000	US\$4,760,000

3. Conditions to allow the execution of the different stages

a) Conditions to allow the execution of Stage 1

- 3.9 In order to authorize the execution of Stage 1, the final designs for the works included in this stage and the corresponding bidding documents would have been completed and approved by the Bank; the external auditors for GS&WC and the program have been hired; tariffs agreed with GOG during the preparation of the program are effective since January 1, 2000 (see par. 5.13); and coverage of all operating costs, including depreciation, is at least 100%.

b) Conditions to allow the execution of Stage 2

- 3.10 In order to authorize the execution of Stage 2, the final designs for the works included in this stage and the corresponding bidding documents would have been completed and approved by the Bank; tariffs agreed with GOG during the preparation of the program are being implemented (see par. 5.13); and coverage of all operating costs, including depreciation, is at least 104%.

c) Conditions to allow the execution of Stage 3

- 3.11 In order to authorize the execution of Stage 3, the final designs for the works included in this stage and the corresponding bidding documents would have been completed and approved by the Bank; tariffs agreed with GOG during the preparation of the program are being implemented (see par. 5.13); and coverage of all operating costs, including depreciation, is at least 115%.

4. Verification of the financial conditions to access the different stages

- 3.12 Prior to releasing the execution of each stage, the GS&WC will present to the Bank a report on the compliance of the tariff and cost recovery conditions indicated above. Independent auditors, acceptable to the Bank, will audit this report. For the purpose of certifying the coverage of costs required for each stage, the auditors will always review the revenues and costs of the last six months with the adequate provisions to ensure that the situation during these six months reflects the financial situation of the service.

D. Performance indicators

- 3.13 The contribution of the program to the improvement of the operational capabilities of GS&WC and its financial situation will be monitored through a series of performance indicators. The value of these indicators will be reflected by the auditors in their annual report.

Table 3.2
Performance Indicators And Benchmarks

INDICATOR	1999	2000	2001	2002	2003	2004
Coverage of operating expenses (in %)						
Calculated as: revenues ³ divided by O&M+D costs	75%	100%	101%	104%	115%	115%
Net Income (in millions of G\$ of 1999)						
Calculated as: revenues minus O&M+D costs	(112.6)	0.0	3.7	18.6	77.5	77.7
Coverage of metering (in %)						
Calculated as: customers billed on metered basis divided by total customers	14%	29%	46%	59%	72%	85%
Collections (in %)						
Calculated as: collections divided by billing	77%	79%	83%	85%	86%	86%
Physical losses (in %)						
Calculated as: 1 - volume of water supplied to customers divided by volume of water produced	70%	66%	63%	60%	57%	55%

- 3.14 As explained above, achievement of the benchmarks for coverage of operating expenses and generation of net income are necessary for the access to the different stages in which the program has been divided. The situation in terms of compliance

³ Calculated as the charges billed to the customers plus the subsidies from GOG allowed in the new tariff structure

with these benchmarks will be reflected by the independent auditors in their annual report.

E. Role and responsibilities of the PMF

- 3.15 The PMF will have two different roles in its daily interaction with GS&WC. The PMF is expected to assist GS&WC in the execution of the physical components of the program as well as to provide institutional strengthening. This arrangement will permit to continue and consolidate the improvements achieved during the RMP. Also, the PMF is expected to have full responsibility for the reduction of physical losses and the commercialization of the service. In these areas, the PMF will provide the necessary personnel and management systems. GS&WC will provide counterpart personnel, which will be fall under the supervision of the PMF and will be trained throughout the program. At the end of the execution period, all the equipment and systems provided by the PMF will revert to GS&WC and GS&WC counterpart personnel will take over. This arrangement will permit a quick improvement in the performance of those critical areas and at the same time will continue the training of GS&WC staff in the different aspects of the service, so this staff can take over all the areas at the end of the execution period. The objectives in terms of metering, collections and reduction of physical losses presented in Table 3.2 above will be reflected in the contract with the PMF and the PMF's remuneration will depend on its success in achieving these objectives. In addition, in order to ensure the sustainability of the improvements, the PMF will record and document all contributions to GS&WC in manuals and procedures in a way that can be used for GS&WC staff in the future.

F. Procurement

- 3.16 The procurement of goods and works and contracting of consulting services will be carried out in accordance with the current Bank policy as reflected in Annexes B and C of the Loan Contract. International competitive bidding will be required for purchases of US\$250,000 and higher in the case of goods and related services, and US\$1,500,000 in the case of construction works. The bidding of amounts below these ceilings will take place in accordance to the local legislation. Annex II presents a summary of the procurement schedule. There will be three bidding processes, each one corresponding to one of the stages in which the program has been divided. Each bidding will be divided in several contracts for the supply and installation of the different works included the stage and bidders will be allowed to prepare offers for all or part of the contracts.
- 3.17 The PMF will be selected through a competitive bidding process. The qualifications of the PMF will be of a water and sewerage utility with experience in the implementation of investment plans like the one involved in this program, or an engineering firm with experience in the operation of water and sewerage systems. In the case of a utility, the firm will have to demonstrate expertise or secure technical assistance to execute the engineering components of the program, whereas in the case of the engineering firm, the expertise to be demonstrated or secured will be in the management of the commercial aspects of the service. The selection of the PMF will be carried out in two phases: pre-qualification of firms and submission of economic proposals. The contract will be awarded to the lower bidder among the firms that were previously pre-qualified. Although this is a

common practice in the procurement of these kinds of services in order to ensure a suitable firm at a lower price, the awarding of the contract based on price is an exception to the Bank's procurement policy.

G. Execution period and investment schedule

- 3.18 The overall execution of the program will be five years from the signature of the Loan Contract. The following table presents a summary of the projected disbursement schedule, with indication of the source of financing.

Table 3.3
Investment Schedule
Direct Costs (US\$000)

YEAR	IDB	LOCAL	TOTAL	%
1	1,325	0	1,325	8
2	6,180	421	6,601	37
3	2,680	1,389	4,069	23
4	2,307	230	2,537	14
5	3,253	0	3,253	18
TOTAL	15,745	2,040	17,785	100%

- 3.19 In terms of the three stages in which the physical works of the program have been divided, the following table presents the expected dates for the beginning and completion of each one of them. The execution of the stages is not sequential, but some overlap has been scheduled provided that the access conditions are complied with. Dates in Table 3.4 refer exclusively to the beginning and end of the construction, with does not include preparation of final designs nor procurement, as reflected in Annex II.

Table 3.4
Execution of Physical Components

STAGE	BEGINS (Quarter/Year)	ENDS (Quarter/Year)	LENGTH (Months)
First	Q2/Y2	Q4/Y3	18
Second	Q3/Y3	Q3/Y5	26
Third	Q3/Y4	Q4/Y5	18

H. Land acquisition and ownership of system assets

- 3.20 Rehabilitation activities will be contained within existing rights-of-way or on property now belonging to GS&WC so no land acquisition will be required. GOG will transfer the systems and facilities to be constructed under this program to GS&WC as equity.

I. Maintenance

- 3.21 The proper maintenance of the systems during the execution period will be secured through the obligations of the PMF in the performance contract. The PMF will help GS&WC implement a preventive maintenance plan, advances of which will be maintained through the program periodic reports. In order to ensure proper maintenance of the rehabilitated system thereafter, each year for ten years after the completion of the program, GS&WC will submit to the Bank an annual maintenance report which will include: (i) details of the organizational arrangements and personnel responsible for maintenance; (ii) information on the conditions of the facilities; and (iii) resources allocated for maintenance in the current and following year.

J. Supervision of the program

- 3.22 The supervision of the program will be carried out by the Country Office. In addition to this, administration missions from headquarters, accompanied if necessary by specialized consultants, will monitor the achievements in the improvement of the service and the financial situation of GS&WC as well as the fulfillment of the conditions to access the different stages. The independent auditor will support this supervision through the annual audit of the financial statements of GS&WC and the program, which will include the achievements in terms of performance indicators, and the certification of compliance with required conditions to access the different stages.
- 3.23 The bidding documents for the selection of the PMF and the corresponding bidding process will be monitored by the Country Office with the support of the Project Team.

K. Implementation of the Environmental Management Plan

- 3.24 The EMP consolidates the mitigating measures, studies and monitoring activities to ensure environmental soundness of the program. The EMP includes benchmarks or products, a timeline for scheduling tasks over the life-of-project, assignment of responsibilities for each respective action, and estimate of the costs for each activity.
- 3.25 The GS&WC, with the support of the PMF, will be the entity responsible for overall implementation and quality control of the EMP. A technical professional will be appointed as coordinator of the EMP. Due to the current limited technical capacity of GS&WC, it is recommended that a qualified staff person of the PMF serve in this role and, depending on the addition of more qualified staff in GS&WC, that capability and responsibilities be gradually transferred to a permanent GS&WC staff member over the course of the program. The *EMP Coordinator* will have the following main tasks: (i) coordinate the overall execution of activities related to environmental management under the program, in accordance with the EMP; (ii) act as principal liaison of the GS&WC with the EPA and, as appropriate, with other governmental agencies in activities pertaining to the EMP, including the requirements set out in the Environmental Permit; and (iii) provide training and follow-up quality control in the application of environmental guidelines and specifications for construction and rehabilitation works.

L. Disbursement and Auditing

- 3.26 GS&WC will open two separate bank accounts, which will be used exclusively for resources of the program: one of them will be used for the local counterpart funds transferred from the Ministry of Housing and Water and the other for the loan funds. **Opening of these accounts will be a condition prior to first disbursement.**
- 3.27 Audited financial statements of the program and GS&WC will be submitted annually to the Bank within 120 days of the end of the fiscal year, in accordance with Bank's requirements. These financial statements will be audited by independent auditors acceptable to the Bank. *An analysis and opinion on the compliance with performance indicators and loan contract obligations will be included in the auditor's report.* The loan resources will finance all audit costs.

M. Ex-post evaluation

- 3.28 The Guyanese authorities have decided not to carry out an ex-post evaluation of the program. At the end of the disbursement period, the success or failure of the program will be judged from the fulfillment of its goal, which will be objectively reflected in the achievement of the target values for the set of indicators that has been proposed.

IV. THE BORROWER AND THE EXECUTING AGENCY

- 4.1 The borrower will be the Co-Operative Republic of Guyana and the program will be executed by GS&WC, which also has the responsibility for the administration and operation of the systems.

A. The executing and operating agency

1. Legal aspects and organization

- 4.2 The Georgetown Sewerage and Water Supply (Amendment) Act 1994 established GS&WC as the agency responsible for the provision of water supply and sewerage services in Georgetown. GS&WC is governed by a board of seven commissioners, which consists of six persons that are formally appointed by the Minister of Housing and Water (the Minister), and the Mayor of Georgetown.
- 4.3 The commissioners appointed by the Minister are: two elected members of the City Council, who are nominated by the City Council; one person to be nominated by the Minister of Finance; one person to be nominated by the Minister of Public Works; one person to be nominated by the Guyana Association of Professional Engineers; and one person to be nominated by the Consumers association of Guyana. The Minister also appoints one of the commissioners to be Chairman and then the commissioners appoint another of their member to serve as deputy chairman.
- 4.4 GS&WC has a total strength of 244 people and is organized around four main departments: operations (with a staff of 147), technical services (with a staff of 46), finance (with a staff of 26) and support services (with a staff of 24). The operations department is in charge of the operation of the production facilities, water distribution system and sewerage and wastewater system. The technical services department is in charge of planning, design and engineering support. The finance department is in charge of general accounting and customer service. Finally, the support services department mainly deals with human resources and public relations.
- 4.5 Personnel has been reduced in the recent years from about 400 to the current 244 and a new organizational structure and salary scale has been implemented. Salary levels, although higher than for other public agencies, are still lower than the private sector. However, a core group of senior management has already been established, which will be further strengthened during the execution of the proposed program.

2. Operation and maintenance of the systems

- 4.6 The capacity of GS&WC to operate the systems has improved as a result of the execution of the RMP. On the side of the operation of the water system, efforts have been consistent with the investments made production and distribution of pressures. The approach in the case of the sewerage system is different, since only a preliminary rehabilitation of pumping stations was included in the RMP and therefore any additional critical repair is being done as a form of crisis management. The main drawback in operations is the weak link with the

commercial area, which should be improved and aimed to reduce unaccounted-for water and increase revenues.

- 4.7 As for the maintenance of the systems, GS&WC is currently implementing a preventive maintenance plan, which is being developed as part of the RMP. The proposed program will contribute to further improve the capability of GS&WC to maintain the existing infrastructure through the arrangement with the PMF.
- 4.8 The improvement in the operation and maintenance of the systems caused an increase in the operational expenses, as opposed to the lower costs of an inadequate operation and maintenance in the past, which has implications in the financial situation of GS&WC as will be presented below.

3. Commercialization of the service

- 4.9 A computerized customer registry was prepared as a result of the Master Plan, which has been used to initiate billing of customers for the first time ever. Residential customers, who are about 25,000 and unmetered, are billed in annual basis. Non-residential customers, who are about 3,000 and metered, are billed on monthly basis.
- 4.10 Although the customer registry contains technical data, only commercial information is updated on a regular basis. However, the main source to maintain an updated customer registry is the feedback from the billing and collection process, and since almost 50% of the registered customers have not paid once since 1996, the customer registry still needs to be validated for these customers.
- 4.11 The billing system has not been installed yet, although bids are currently under evaluation. Software in use by other public utilities in the country (like GUYWA and Guyana Electricity Corporation) was acquired in 1996, but after several unsuccessful trials it was finally rejected because of lack of compliance with the required specifications. The installation of a billing system -which is part of the RMP- will permit the billing of non-residential customers in quarterly basis -as opposed to current annual basis- and the enforcement of disconnection in the case of arrears.

4. Financial situation

- 4.12 Prior to the RMP, GS&WC did not have proper financial statements. Today, financial statements are produced in accrual basis except for revenues from unmetered customers, which are still registered in cash basis.
- 4.13 The following table presents the financial situation of GS&WC in the past three years in terms of income statement. For the purpose of the analysis, all revenues have been converted to accrual basis. On the one hand, due to the effect of inflation tariff rates have lost more than 20% of their real value since they were approved in 1994. On the other, operating expenses have increased mainly because of the increase in production and proper maintenance of the systems. As a consequence, coverage of operation and maintenance costs have been decreasing at a steady pace, from 104% in 1996, to 87% in 1997, to only 66% in 1998. A new tariff level and structure has been agreed during the preparation of the program, which will be presented with further detail in Section V of this document.

Table 4.1
GS&WC Income Statement (US\$000)*

	1996	1997	1998**
Metered customers	334	395	440
Unmetered customers	1629	1548	1405
Other revenues	117	67	41
TOTAL REVENUES	2080	2010	1886
Employment	(674)	(752)	(796)
Repairs and maintenance	(282)	(254)	(451)
Administration	(87)	(122)	(142)
Electricity and fuel	(597)	(742)	(1039)
Chemicals	(224)	(302)	(270)
TOTAL O & M COSTS	(1864)	(2173)	(2698)
Depreciation	(140)	(129)	(141)
TOTAL EXPENSES	(2004)	(2302)	(2839)
OPERATING INCOME	76	(292)	(953)
Subvention from GOG	1069	1159	862
PROFIT/LOSS	1145	867	91

* Exchange rate (G\$/USD): 140.4 (1996), 142.4 (1997), and 150.00 (1998)

** Not audited yet

- 4.14 Since only a percentage of revenues is collected (55% in 1996, 65% in 1997 and 77% in 1998), the effect in terms of cash flow is even more dramatic. The following table shows how in 1996 and 1997 the cash deficit was basically covered by the Government subvention, but such a subvention was no longer sufficient in 1998.

Table 4.2
GS&WC Cash-flow (US\$000)*

	1996	1997	1998**
Collections	1025	1255	1398
Other receipts	119	70	43
TOTAL RECEIPTS	1144	1325	1441
Operating costs	1864	2173	2698
OPERATING CASH-FLOW	(720)	(848)	(1257)
Subvention	1069	1159	862
SURPLUS/DEFICIT	349	311	(395)

* Exchange rate (G\$/USD): 140.4 (1996), 142.4 (1997), and 150.00 (1998)

** Not audited yet

4.15 Revenues come almost exclusively from tariffs. The tariff structure adopted by GS&WC is very simple: US\$0.30 per m3 for metered customers, a flat rate of US\$6.00 per month for unmetered customers with sewerage and a flat rate of US\$4.00 per month for unmetered customers without sewerage. About 2850 industrial and small commercial customers are currently metered. As for residential customers, approximately 500 customers have been metered with the purpose of assessing consumption patterns and levels, and another 6,000 meters will be installed as part of the execution of the RMP.

4.16 A tariff of US\$0.30/m3 is sufficient to cover production costs, which were approximately US\$0.25/m3 –including depreciation and current physical losses and wastage- in 1998. Therefore, lack of coverage of operating expenses is more a problem of billing and collection than tariffs. That is, non-residential customers are metered and the billing reflect their consumption, but residential customers –all unmetered- are billed based on an estimated consumption of 12 m3/month, which is about half of their actual consumption. This significant underbilling has an important impact in revenues. In terms of cash-flow, the situation is even worse since collections for non-residential (metered) customers is 88%, but this percentage drops to 43% in the case of residential (unmetered) customers, who are the bulk of GS&WC customer base at this time.

B. Interaction with the project management firm during the RMP

4.17 A key aspect in the execution of the RMP was the existence of a project management firm in charge of the implementation of works and the provision of institutional strengthening. In the first instance, staff members of the project management firm assumed responsibility for the various positions within the organization. This arrangement applied in the initial stages of the project before the new organizational structure was approved and continued for the first two years, even after the new staff members were appointed. During this period, a twinning arrangement was in place in which the GS&WC staff members worked alongside with project management firm staff and were trained to undertake their new roles.

4.18 After two years, the responsibilities for the various positions were transferred back to the GS&WC staff with the project management firm staff then assuming roles as

consultants providing technical and managerial support to the new GS&WC staff. At the same time, the project management firm continued to be directly responsible for execution of the physical works included in the project with specific GS&WC staff, such as the technical services manager and planning engineer being trained in these activities.

- 4.19 As it was mentioned before, the existence of a project management firm was decisive for the execution of the RMP without the significant delays that are characteristic in other Bank projects in Guyana. However, the Terms of Reference for the project management firm did not hold this firm responsible enough in achieving improvements in the provision of the services. That is, its responsibilities were limited to the execution of the physical components of the program and the assistance in the institutional strengthening of GS&WC.

C. Conclusions

- 4.20 There are three main conclusions that arise from the analysis of GS&WC as *executing and operating agency*. The first one is that despite important organizational changes and institutional strengthening, GS&WC still needs support to train and improve its core management and other support personnel. The second is that the current financial situation of the service is critical and that measures for improvement will have a strong component of proper billing and collection. Finally, the third conclusion is that a business-like approach in the provision of the services is required, which even if the right tools are being provided, can only be done with an adequate system of incentives. As explained in the following section, the new program addresses these problems through the recruitment, again, of a PMF and the clear definition of roles and responsibilities between GS&WC and the PMF.

V. VIABILITY AND RISKS

A. Technical viability

- 5.1 The proposed program is the second stage in the rehabilitation of the water supply and sewerage systems in Georgetown. The physical works included in the program are based on the guidelines and recommendations of the Master Plan of 1994 as well as some additional information that was made available as a result of the execution of the RMP.
- 5.2 The proposed works have been defined at the level of preliminary design, and typical bidding documents have been prepared. The Bank is currently preparing non-reimbursable technical cooperation to contract out the final designs for the works in the first stage so the procurement of the works can begin as soon as the loan is declared eligible. The rest of the final designs will be prepared as part of the normal execution of the program.
- 5.3 A more detailed analysis of alternatives for the sludge pretreatment facility might be required, which will be undertaken as a previous step to the preparation of final designs. Since the sludge will be disposed of into the Demerara river, this analysis will include the input from the study of the capacity of dilution of the river at the point of discharge, which is also undertaken as part of the above-mentioned technical cooperation. The amount allocated for the sludge pretreatment facility is less than 5% of the direct cost of the program, so even if there is a difference in the final estimate as a result of this more detailed analysis, the overall impact in the cost of the program will not be significant.
- 5.4 Since most of the proposed works consist on rehabilitation, construction of aeration and clarification units to remove iron content from water, installation of meter and sectorization of the distribution system, the overall technical complexity involved in the execution of the program is low. The benchmarks in terms of reduction of physical losses have been set under the assumption that losses in rehabilitated areas, in which the whole distribution system is going to be replaced, will be at the level of 10-15%.
- 5.5 The program has an important difference with the RMP in terms of technical feasibility, which is a detailed definition of works rather than an allowance to carry on some categories of investments. This implies that the chances of having to modify the type or the location of works once the program has been approved are minimal. This change of approach makes perfect sense since the knowledge of the systems is much higher now than when the first operation was being prepared.
- 5.6 As for the cost estimates, since there is a record of unit prices as a result of the execution of the ongoing RMP, the cost for the new components are considered accurate. In any case, a physical contingency of 15% of direct costs has been included in the cost of the program. The estimated program cost is based on the bill of quantities by the consulting firm contracted to prepare the preliminary designs. The unit prices are supported by quotations for materials, equipment and labor and the corresponding analysis of the necessary time to complete the

different activities of the program. Prices are current prices at March 31, 1999 using a rate of G\$175/US\$.

B. Institutional viability

- 5.7 As it was mentioned in Section IV of this document, an important effort was made during the Remedial Maintenance Program in establishing GS&WC as an autonomous operating agency. However, the agency still needs support in two aspects: training and an adequate incentive system.
- 5.8 The organizational chart, overall number of personnel and salary structure has been recently reviewed. A core management group has been established, which still needs external support to consolidate the achievements of the ongoing program and foster further improvements in the operation, maintenance and administration of the systems. The PMF will provide this support and a steady transfer of technology. At the same time, the PMF will take over the most critical areas of the service –commercialization of the service and reduction of physical losses- with the purpose of achieving visible results and training GS&WC personnel to manage these areas in the future. The selection of the PMF is a condition prior to the first disbursement. The extension of the contract of the current PMF for a year using available funds in the ongoing program will ensure a continuous support while the new PMF is selected.
- 5.9 Even with well-trained personnel, the problem of providing these personnel with the adequate incentives would remain. As a public agency, GS&WC lacks the pressure of shareholders to foster efficiency in the provision of the services. Decisions that should normally be made in the context of a business-like environment are sometimes made as a result of some political input. The contractual arrangements with the PMF already mentioned in Section III -i.e. the system of incentives and penalties to achieve some performance indicators- will a private sector approach in the decisions making process.
- 5.10 Finally, an important part of the institutional viability of this one and future programs is the active participation of the community in the provision of the services. This participation implies, on the one hand, and adequate communication to the public of the improvements in the quality of the service and, on the other, the customers' concerns about the problems of the services and the priorities in the investment plans.
- 5.11 The EMP includes measures to ensure public dissemination of the main quality parameters of the service, as well as a public awareness and education program. Also, the composition of the program in terms of physical works was tested against the perception of the customers through surveys and focus groups carried out during the analysis of the economic feasibility of the program. Finally, the customers are represented in the Board of GS&WC through one of the directors.

C. Financial viability

1. Tariffs

- 5.12 Current tariff setting, as described in Section IV, does not provide the adequate incentives for a rational use of the service nor does generate the revenues to cover the cost of the services. The contribution of the proposed program in this aspect is the concept of universal metering and a tariff level that approaches the economic cost of the service. That is, the installation of approximately 16,800 meters -besides the meters already included in the RMP- will increase the percentage of metered customers to up to 85% of the total customer base. Also, a long run marginal cost study was undertaken as part of the preparation of the program. The new tariff setting will allow coverage of approximately 80% of the marginal cost of the services during the execution of the third stage of investments of the program.
- 5.13 A new tariff level and structure was agreed with GOG during the preparation of the program, with detail of what is paid by customers and what is paid by GOG on behalf of the low income customers as subvention. Agreed tariffs are expressed in nominal G\$, and, even with and assumption of 5% annual inflation in costs, they yield a coverage of operation, maintenance and depreciation costs of 100% in 2000, 104% in 2002 and 115% in 2003. Subsidies on these rates are based on actual consumption and the economic situation of customers, as explained further down, and funds will be transferred to GS&WC according to the information supplied by its billing system. Rather than an automatic adjustment of rates with inflation, GOG has agreed to revise tariffs when necessary in order to ensure those coverages and also to generate a net income for GS&WC of G\$18.6 million in 2002 and G\$77.5 million in 2003. These benchmarks were set in G\$ of 1999 and their equivalent in US\$ is approximately 100,000 and 450,000 respectively. Enforcement of these agreements will be done through verification by Bank prior to the authorization for the execution of each stage in which the physical components of the program were divided.
- 5.14 The new tariff represents an important improvement in terms of structure –rates take into account socioeconomic situation of customers-, in terms of sewerage charges for metered customers, and finally in terms of justification and focalization of subsidies, which are based on an estimation of the ability to pay for each category of customer. Also, the new tariffs introduce for the first time the concept of generation of positive net income as opposed to just the coverage of operating expenses. This concept is key in the financing of future investment plans and bring GS&WC to a position of sharing financial responsibilities with GOG in future operations.

2. Operational Efficiency

- 5.15 The execution of the physical components of the program and the participation of a PMF in the operation of the systems will contribute to improve the quality of the service and foster operational efficiency. Leakage is going to be reduced from 70% to 55% of production through sectorization of the water distribution system

and rehabilitation of some zones. This, together with the rationalization of the use of energy in pumping stations will reduce the variable costs production. Also, from the commercial point of view, metering will reduce commercial loses and encourage water conservation. Finally, the improvement in the water quality and pressure will contribute to improve billing and collection. The combined result of a reduction of operating expenses and increase in collections, together with the new tariff setting explained above, will effect an improvement in GS&WC's financial situation.

3. Financial projections

- 5.16 Financial projections were prepared in order to analyze the effect of the combination of the operational improvements and the new tariffs. The following assumptions were made in order to prepare financial projections for the period 1999-2004:
- a. Customer base remains constant except for the normal growth of population, as well as production and demand of non-resident customers.
 - b. Metering of 6,000 customers during the remains of the RMP and 16,800 as a result of the new program is implemented gradually, and consumption drops from 28 to 24 m³/month after the meter has been installed.
 - c. Operating expenses are based in 1998 values, plus the gradual effect of the cost of operation of the new facilities and savings in production costs due to the reduction of physical loses and the rationalization of energy costs in pumping stations. Local inflation was assumed at 5% per year.
 - d. Physical loses are reduced gradually from 70% to 55%.
 - e. Collections increase gradually from 77% to 86%.
 - f. The new tariff rates are effective no later than January 1, 2000 and implemented as agreed during the preparation of the Program.
- 5.17 As for the tables 5.1 and 5.2 presented below, GS&WC would cover operation, maintenance and depreciation costs in year 2000 and there is a positive generation of cash-flow during the same year. As reflected in Table 5.3 the direct subvention from GOG to the low income customers implicit in the revenues is at the level of US\$214,000-237,000 per year. During the first year only, there is also an additional contribution of GOG to unmetered customers in categories different from the ones receiving subsidies in order to facilitate the transition to the new tariffs. The amount of this additional contribution is approximately US\$40,000.
- 5.18 That is, although tariff and collection clauses in the ongoing operation were not complied with, the new arrangement not only permits that GS&WC achieves in the first year of execution of the new program the financial goals set forth in the RMP, but also establishes the grounds for a future participation of GS&WC in the financing of investments.

Table 5.1
GS&WC Income Statement (US\$000)

	1999	2000	2001	2002	2003	2004
Metered customers	733	1243	1640	1983	2504	2745
Unmetered customers	1191	1243	889	680	468	248
TOTAL REVENUES	1,924	2,486	2,529	2,663	2,971	2,993
Employment	(723)	(730)	(737)	(745)	(752)	(760)
Repairs and maintenance	(275)	(278)	(281)	(284)	(286)	(289)
Administration	(129)	(130)	(131)	(133)	(134)	(135)
Electricity and fuel	(938)	(860)	(805)	(766)	(692)	(632)
Chemicals	(248)	(217)	(196)	(182)	(171)	(163)
TOTAL O & M COSTS	(2,313)	(2,216)	(2,151)	(2,109)	(2,036)	(1,979)
Depreciation	(254)	(283)	(358)	(460)	(556)	(648)
TOTAL EXPENSES	(2,567)	(2,499)	(2,509)	(2,569)	(2,592)	(2,627)
OPERATING INCOME	(643)	(13)	20	94	379	321
Coverage of O&M+D	75%	100%	101%	104%	115%	114%

Table 5.2
GS&WC Cash-flow (US\$000)

	1999	2000	2001	2002	2003	2004
Metered customers	1,389	2,023	2,149	2,296	2,585	2,608
TOTAL RECEIPTS	1,859	2,463	2,604	2,751	2,904	3,064
Operating costs	(2,313)	(2,216)	(2,151)	(2,109)	(2,036)	(1,979)
OPERATING CASH-FLOW	(454)	247	453	642	868	1085

Table 5.3
Detail of GOG Subsidy (US\$000)

	1999	2000	2001	2002	2003	2004
Low income customers						
Metered		51	94	125	153	179
Unmetered		186	136	99	66	35
Subtotal		237	230	224	219	214
Transition to new tariffs						
Metered		0	0	0	0	0
Unmetered		40	0	0	0	0
TOTAL SUBSIDY		277	230	224	219	214

4. Local counterpart

- 5.19 The local counterpart of the program, in the amount of US\$3.0 million, will be provided by the Ministry of Housing and Water. In 1999, the Ministry of Housing and Water was allocated a budget of approximately US\$2.0 million for capital expenditures, of which 47% is being used for housing, 51% for water and the remaining 2% for other investments. The average contribution of this ministry to the RMP in the past three years is US\$0.4 million per year. The new program will increase the annual contributions from US\$0.4 million to US\$0.6 million per year, which is still within the current levels of investment.

D. Socioeconomic viability

1. Cost benefit analysis

- 5.20 In order to carry out the economic analysis of the program three main components were established: rehabilitation of high priority zones, sectorization and metering of zones with relatively better service, and emergency rehabilitation of the public sewerage system. The investments in metering and iron removal were allocated according to the number of connections in each of the two water system components. The cost of management and supervision were allocated using the same criteria among all three components. The cost benefit analysis took into account major distortion in the allocation of resources in the economy by transforming market prices into efficiency or economic prices⁴.

2. Rehabilitation of high priority zones

- 5.21 The rehabilitated area consists of four zones with 7,527 service connections, which is equivalent to 26 percent of the city connections. The investments include trunk mains, distribution system, service connections and meters. The total direct cost has been estimated at preliminary design level at US\$7,145,000. Since the existing production capacity is higher than what is needed for a rehabilitated and efficiently operated system, the investment costs of production are not incremental and therefore not included in the economic evaluation. As a result, one would expect high economic return on the investments for the rehabilitation of the distribution network.
- 5.22 The zones to be rehabilitated were selected, as part of the technical feasibility study, using a scoring method with the following criteria: type of pipe, age of pipe, average annual number of breaks reported, location of pipes, average residual pressure in zone and number of customers in zone. All the criteria used were weighted equally. The benefit of rehabilitating the distribution network is estimated as the net change in the willingness to pay of benefiting households and the reduction of GS&WC operating costs. Because of the limitation of SIMOP for the analysis of rehabilitation projects, a specific evaluation model was developed in Excel. Although the general structure is similar to SIMOP, the model allows

⁴ The adjustment factors that were used are the following: standard conversion factor = 1.021; electricity = 1.072; and unskilled labor = 1.

amore flexible analysis of water consumption outside the dwelling as well as alternative forms for the demand function.

- 5.23 Table 5.4 below shows the cost benefit results for the four zones selected to be rehabilitated. It can be observed that savings in operational cost are relatively small compared to household welfare gains. The current variable cost of production is estimated in only US\$0.04 per cubic meter, and the current cost facing most households is higher than US\$1.30. Table 5.4 also shows that all rehabilitated zones yield an economic return significantly higher than the minimum level of 12 %. The proposed program will complete the rehabilitation of zone W1 that was initiated as part of a World Bank project ("El Niño Emergency Project"). The costs per connection in the latter project are significantly lower. It is very likely that the full benefit of the World Bank project can be achieved only if the investments of this program in zone W1 are materialized.

Table 5.4
Cost benefit results of the distribution network rehabilitation
(Present values using a discount rate of 12%)

Zone	Service Connection	Population	WTP Households	GS&WC Costs Savings	Investment Costs	IRR
W1	1,829	12,803	1,203,669	366,126	1,283,286	14.2%
W2	2,607	16,163	3,893,123	403,758	2,860,537	17.2%
W4	2,149	13,324	3,198,077	332,825	1,932,879	20.4%
W14	2,092	12,970	3,103,711	323,997	2,215,047	17.7%
All Zones	8,677	55,260	11,398,580	1,426,706	8,291,749	17.6%

- 5.24 The main risks affecting the results of this component are associated with the investment in costs, the time required for the completion of the works and the adjustment factors for electricity rate and foreign exchange. The time required to complete the rehabilitation investments in each zone is expected to be two years, and it is assumed to fluctuate from 1.5 to 4 years. An increase of the exchange rate can also negatively affect the economic performance of this component, because the share of foreign exchange is much larger in the investment costs than in the benefits.

3. Zone sectorization

- 5.25 The objective of this component is to improve the operation of the system, the control of unaccounted-for water, and the distribution of available water to areas located outside the zones to be rehabilitated by the program. To achieve this objective, the main investments are water transmission lines and bulk valves. Similarly to the rehabilitation component, the costs of metering, supervision and management, and iron removal are included in the cost benefit analysis. The general approach of this component is that meters will be installed only to

customers whose supply has achieved a minimum standard water pressure and iron concentration⁵. With the program, five zones (W3, W7, W8, W12 and W13) will be suitable for metering with a total of 9,265 customers, or approximately 57,443 people. Currently, only one zone (W12) with 1229 connections comply with the pressure requirement, which is equivalent to 13.3 % of total domestic connections of the five zones to be metered outside the rehabilitation area. Monte Carlo simulations were used to take into account the uncertainty on the number of households that would effectively benefit in the five selected zones. Similarly to the rehabilitation component the exchange rate and the execution period are also important risk factors. The cost benefit results evaluated at the means are reported in Table 5.5.

Table 5.5
Cost benefit results of sectorization
(Present values at 12%)

Service Connections	Population	Household WTP	GS&WC Cost Savings	Investment Costs	IRR
9,265	57,443	7,772,185	558,680	4,491,802	20,0

- 5.26 Table 5.5 also shows that most benefits would be perceived by households. A metered program without significant improvement in the service quality for households (with a purely conservation objective) is not economically viable since the present value of GS&WC cost savings are much lower than the present value of investment costs.

4. Sanitation

- 5.27 This component includes upgrading of all 24 pump stations, the replacement of damaged and blocked yard sewers in Charlestown, Werk-en-Rust, Albouystown, Wortmanville and Bourda for a total length estimated in 91,500m., and the replacement of collapsed street sewers for 16,474m. Total direct cost has been estimated in US\$6,560,000. For the cost benefit analysis, management and supervision cost was also considered. The need to rely on pumping stations for all 24 sewerage basins create a significant operational and maintenance challenge for GS&WC. It is expected that upgrading the 24 pump stations would significantly improve the operational level of the system reducing at a large extent the problem of back-sewage in property yards. The installation of grinders will avoid the pump and motor being damaged by solids. In addition the upgrade of pumping stations will improve the efficiency of operation and the safety conditions for regular maintenance. Similarly to the sectorization component, in order to reflect the uncertainty about the number of households that would benefit from the sanitation investments, the cost benefit indicators are estimated as the mean of the values calculated by Monte Carlo simulations. Table 5.6 shows the cost benefit results.

⁵ The two service quality criteria proposed in the technical analysis of the program are: A minimum residual pressure of 10 psi. at the customers connection and maximum iron concentration of 0.5 mg/l.

Table 5.6
Cost benefit results of investment in sanitation
(Present values at 12%)

Service Connections	Households	Households WTP	Operating Costs	Investment Costs	IRR
8,540	10,959	8,002,101	1,271,983	6,343,735	12.6

- 5.28 The probability of obtaining an IRR greater than 12 % is estimated in 53,4 %. The main risks of this component are operational and financial. Unlike the water system investments, this component requires a significant increase in operational costs, mainly power to operate the 24 pumps for 12 hours per day.

5. Ability to pay

- 5.29 The new tariffs rates agreed with GOG apply to all customers. However, a large part of the population of Georgetown does not have the ability to pay for those charges. The restriction is reflected in the principle that the effort involved in the payment of the water and sewerage services should not exceed 3% of the available income in the case of potable water and 5% in the case of the water and sewerage services. The socio-economic analysis of a sample of customers showed that around 63% of the residential customers would face payments higher than the criteria established if they were billed the economic rates. Consequently, GS&WC has developed a scheme to subsidize the low income population based on the existing customer registry, which classifies the customers in five ratable value bands that reflect the value of the properties. Subsidies are targeted to customers in the two lower ratable bands, which represent approximately 55% of the total customers. Thus, this approach to focalize subsidies is consistent with findings of the socio-economic study in relation to the ability to pay.

6. Poverty targeted investment criteria

- 5.30 The program qualifies as poverty-targeted investment by the geographic criterion. That is, the percentage of beneficiaries below the poverty line is higher than the percentage of population in the country below the same poverty line. The calculation was made assuming a poverty line of US\$20.90 per capita and month. Based on this figure, the household income data collected as part of the water and sanitation survey carried out during the preparation of the program reflects that 36.3% of the beneficiaries are poor. Since this percentage is higher than the percentage of population in the country that is considered poor (25.3%, assuming the same poverty line and UNDP income data), the program qualifies as poverty-targeted investment.

E. Beneficiaries

- 5.31 The program will have important environmental and social benefits for the citizens of Georgetown. A greater number of Georgetown residents will have improved access to a dependable and safe potable water supply, thus improving

the hygiene and reducing the incidence of illnesses and disease caused by waterborne pathogens. Rehabilitating the water distribution system, combined with an effective public awareness and education program, will contribute to substantially reduce the volume of unaccounted-for water, that is currently lost to leakage, therefore reducing the demand for raw water. As consumers are made more aware of the proper use of water and repair their own plumbing, even more significant reductions in water demand should be achieved. Accordingly, conservation of both surface and ground water resources can be improved, and consumption of energy and use of water treatment chemicals can be reduced with substantial savings of scarce financial resources.

- 5.32 Repaired and more efficient operation of existing sewerage systems, rehabilitation of yard sewers, cleaning and efficient connections of septic tanks, and improved use of sanitary systems by homeowners and businesses (reductions in solid waste disposal and blockages, repair and correct function of indoor plumbing) should lead to improvements in household and municipal environmental health conditions. In relation to these improvements, there should be measurable reductions in the prevalence of sickness and disease caused by ingestion of and/or incidental contact with septic organisms.

F. Environmental feasibility

- 5.33 The deterioration of the sanitary conditions in Georgetown has implications for the ecology and public health that the proposed Program is designed to address. The Program is expected to have a net positive environmental impact, as the pollution levels in the drainage system will improve and the proper maintenance and disposal of sludge from septic tanks will contribute to reducing environmental degradation.
- 5.34 Environmental issues that are still pending, because of the deficiencies in the Master Plan analysis, will be resolved with the incorporation of specific studies and monitoring programs to be initiated under the program, including: the environmental viability of the discharges of untreated sewage from the Fort Groyne outfall into the Demerara River; the technical need and desirability of primary sewage treatment; and the environmental and economic viability of continued and expanded pumping of ground water resources from the A Sands and B Sands aquifers. Also, the implementation of water quality monitoring of surface and ground raw water sources and treated water will permit more efficient control of water treatment processes, detection of deficiencies in the distribution system and protection of the health of consumers.
- 5.35 The limited capability of GS&WC to supervise the timely and correct application of environmental guidelines under the contracts for construction activities could pose risks of accidents to both workers and citizens, and increased levels of nuisance to consumers. Similarly, if GS&WC and the PMF fail to coordinate and supervise the quality of the studies and monitoring programs proposed under the EMP, there exists the potential that the results will not be scientifically valid nor applicable in resolving environmental management issues left pending. Such situation would have negative effects on the decision process in latter phases

under the Master Plan. The establishment of the EMP Coordinator through the PMF will mitigate these risks and assure that the activities and measures are properly and timely executed.

- 5.36 Perhaps the most important impact to the environment and Georgetown citizens' health would be a delay in implementing the program and projects proposed under latter phases of the Master Plan. Deterioration in the existing water treatment and distribution system will continue, with increased water losses and increased costs of production, wasteful over-exploitation of ground water resources and, potentially, drastic lowering of water tables, increased pumping costs, and saline intrusion. Water supply service and water quality would deteriorate with a concomitant degeneration in quality-of-life factors and increase in the incidence of waterborne diseases. Without proposed sewerage improvements, environmental health conditions will continue to deteriorate as more contaminants are added to the urban environment due to the continuing surges, back-ups and spilling of sewage into streets, yards and canals.
- 5.37 In order to facilitate the timely and efficient execution of the EMP by GS&WC, some specific contractual conditions are recommended for inclusion in the loan contract, as follows:
- a. Conditions prior to the first disbursement:
 - i) Have a technical professional of the PMF appointed to serve as Coordinator of the Environmental Management Plan.
 - b. Other conditions:
 - i) Prior to authorizing execution of Stage 1, the Borrower shall present a list of contingency plans for operation of water supply and sewerage systems.
 - ii) Prior to approving documents for construction contracts, the Borrower shall provide evidence, to Bank's satisfaction, that:
 - The environmental management guidelines, as defined in the ESIR and incorporated into the technical specifications for construction and rehabilitation works, prepared with the final designs, have been included in the bidding documents, as well as the applicable contractual clauses to ensure compliance by contractors;
 - Project works are in compliance with all applicable environmental regulations under the Environmental Protection Act, as required by the environmental authority.
 - iii) GS&WC, through its PMF, shall present annual progress reports in which advances and delays in implementation of the EMP are discussed, and any significant results evaluated for each activity under the Plan.

G. Risks

- 5.38 The main risk of the program is that, if the execution is focused on the physical components and the financial aspects might be relegated to a second level. In order to mitigate the risk, the following measures have been included: (i) the achievement of the financial sustainability pursued by the RMP is achieved during the first year of execution, and guaranteed by a new tariff level and structure; (ii) the execution of the physical components will be done in stages, and the conditions necessary to access each one of the stages is that the financial sustainability achieved during the first year has been maintained; (iii) the program includes the participation of a PMF, whose retribution will be linked to performance indicators.
- 5.39 The participation of the PMF as part of the measures to ensure an adequate strengthening in institutional and financial aspects implies another risk: this participation is not guaranteed and it might be lack of interest on the side of potential bidders. In order to mitigate this, the selection of the operator will be done with the assistance of a specialized consultant, which will discuss and prepare bidding documents, survey the interest of the market, and adjust the documents accordingly. Continued assistance to GS&WC while the PMF is selected will be ensured through the extension of the contract of the current PMF for a year as part of the ongoing operation. This extension will basically maintain the current support to the core management team of GS&WC as well as contribute to the successful implementation of the metering and billing and collection system that will complete the execution of the RMP.

GUYANA

GEORGETOWN WATER SUPPLY AND SEWERAGE REHABILITATION PROGRAM II (GY-0054)

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>improve the sanitary conditions of the city in Georgetown and reduce the current environmental degradation through an investment in the quality of the water supply and sewerage services.</p>	<p>Incidence of water borne diseases</p>	<p>Health indicators</p>	
<p>improvement of availability and quality of water supply and reliability of the system. improvement of the performance of the sewerage system. consolidation and further improvement of GS&WC as the operating agency.</p>	<p>The image of GS&WC as operating agency has improved and changes in the quality of the service reflect in an increase of collections.</p>	<p>Focus groups and other customer surveys</p>	<p>Other factors affecting health conditions do not worsen, like for example the collection and disposal of solid waste.</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Improvement of availability and quality of water and reliability of the system.</p>			
<p>Quality of the water supplied to customers improved</p> <p>Leakages in the distribution system have decreased</p> <p>There is a more efficient use of available water</p>	<ul style="list-style-type: none"> Iron content in water treated by the iron removal facilities has been reduced to less than 0.5mg/l Average pressure in the system has increased to 10psi Physical losses have been reduced from 70% to 55% 	<ul style="list-style-type: none"> Monitoring program based on sampling and lab analysis GS&WC operating reports GS&WC operating reports 	<p>GS&WC operates the new system effectively and efficiently</p>
<p>Construction of iron removal plants in two locations</p> <p>Installation of 7650 m of water trunk mains</p> <p>Rehabilitation of four zones of the distribution system</p> <p>Rehabilitation of the distribution system</p> <p>Installation of 16,800 meters</p>	<p>BUDGET IN MILLIONS OF US\$</p> <ul style="list-style-type: none"> Central Ruimveldt: US\$0.9; Sophia: US\$0.9. Agricola: US\$0.3; Turkeyen: US\$0.6. Zone W1: US\$1.0; W2: US\$1.9; W4: US\$1.2; W14: US\$1.5. Sectorization: US \$0.4. Metering: US\$1.8. 	<p>Semi-annual reports and financial statements of the program</p>	<p>Tender calls for construction of proposed works are successful and construction quality is satisfactory</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Improvement of the performance of the sewerage system</p>			
<p>Leaks in the sewerage system have been reduced</p> <p>Sludge from septic tanks is disposed of properly</p>	<ul style="list-style-type: none"> All pumping stations are working normally and there are no more spillovers of sewage. There is no more discharge of sludge in drainage ditches or sewage pumping stations. 	<ul style="list-style-type: none"> GS&WC operating reports and complaints from customers. Visual inspections of current problem areas 	<p>GS&WC operates the new system effectively and efficiently</p>
<p>Rehabilitation of the sewer system</p> <p>Construction of a sludge pretreatment facility</p>	<p>BUDGET IN MILLIONS OF US\$</p> <ul style="list-style-type: none"> Pumping stations: US\$2.6; Yard sewers: US\$2.7; Street sewers: US\$1.3. Sludge pretreatment facility: US\$0.8. 	<p>Semi-annual reports and financial statements of the program</p>	<p>Tender calls for construction of proposed works are successful and construction quality is satisfactory</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Consolidation and further improvement of WC as the operating agency.</p>			
<p>GS&WC operational efficiency has improved</p> <p>GS&WC financial situation has improved</p>	<ul style="list-style-type: none"> Physical losses are reduced from 70% to 55% at the end of the program; metering has increased from 14% to 85% of customers Coverage of O&M+D is 100% in 2000, 104% in 2002 and 115% in 2003 and thereafter; a net income of US\$100,000 is generated in 2002 and US\$450,000 in 2003 and thereafter; collections have increased from 77% to 86% 	<ul style="list-style-type: none"> GS&WC operating reports GS&WC financial statements and collection reports 	<p>The Project Management Firm provides the means and incentives to achieve the agreed benchmark and GS&WC provides adequate counterpart personnel.</p>
<p>Contracting of Project Management Firm</p>	<p>BUDGET IN MILLIONS OF US\$</p> <ul style="list-style-type: none"> Project Management Firm: US\$3.5 	<p>Semi-annual reports and financial statements of the program</p>	<p>Tender calls for selection of successful firms and services provided by those firms are adequate.</p>

GUYANA

GEORGETOWN WATER SUPPLY AND SEWERAGE REHABILITATION PROGRAM II (GY-0054)

PROCUREMENT

PROCUREMENT PLAN		Financing (US\$ million)			
Number	Goods procurement and construction	IDB	LOCAL	TOTAL COST	PUBLICATION (quarter/year)
1	Project Management Firm	3.5	0	3.5	Q1/Y1
2	Supply and construction, works in Stage A: -construction of Central Ruimveldt iron removal plant -rehabilitation and sectorization of zones W1, W2 & W4 -installation of meters in zones W1, W2 & W4 -rehabilitation of sewerage pumping station	5.61	0	5.61	Q3/Y1
3	Final Design, works in Stage B	0.25	0	0.25	Q2/Y2
4	Supply and construction, works in Stage B: -construction Sophia iron removal plant -rehabilitation of zone W14 and sectorization of the remaining zones -installation of water trunk mains -installation of meters in zones W14, W3, W7, W8, W12 & W13	5.375	2.040	7.415	Q4/Y2
5	Final Design, works in Stage C	0.25	0	0.25	Q2/Y3
6	Supply and construction, works in Stage C: -rehabilitation of the sewer system -construction of a sludge pretreatment facility	4.760	0	4.760	Q4/Y3

LCB Local competitive bidding

ICB International competitive bidding

TIMETABLE FOR TENDER CALLS

CONTRACT TO BE TENDERED	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	COST million
Project Management Firm	IIIIIIIEEEEE	EEEEEEEEEEEE	EEEEEEEEEEEE	EEEEEEEEEEEE	EEEEEEEEEEEE	3.5
Supply and construction, works in Stage A: -construction of Central Ruimveldt iron removal plant -rehabilitation and sectorization of zones W1, W2 & W4 -installation of meters in zones W1, W2 & W4 -rehabilitation of sewerage pumping station	IIIIII	IIIEEEEEEEEE	EEEEEEEE			5.6
Final Design, works in Stage B		IIIIIIIEEE	E			0.2
Supply and construction, works in Stage B: -construction Sophia iron removal plant -rehabilitation of zone W14 and sectorization of the remaining zones -installation of water trunk mains -installation of meters in zones W14, W3, W7, W8, W12 & W13		III	IIIIIIIEEEEE	EEEEEEEEEEEE	EEEEEEEE	7.4
Final Design, works in Stage C			IIIIIIIEEE	E		0.2
Supply and construction, works in Stage C: -rehabilitation of the sewer system -construction of a sludge pretreatment facility			III	IIIIIIIEEEEE	EEEEEEEEEEEE	4.7

L Local tendering

I International tendering

E Execution

PROPOSED RESOLUTION

**GUYANA. LOAN ____/SF-GY TO THE CO-OPERATIVE REPUBLIC OF GUYANA
(Georgetown Water Supply and Sewerage Program II)**

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Co-Operative Republic of Guyana, as Borrower, for the purpose of granting it a financing to cooperate in the execution of the Georgetown Water Supply and Sewerage Program II. Such financing will be for an amount of up to twenty-seven million dollars of the United States of America (US\$27,000,000), or its equivalent in other convertible currencies, from the Fund for Special Operations of the Bank, and will be subject to the "Special Contractual Conditions" and the "Financial Terms and Conditions" of the Executive Summary of the Loan Proposal.