

FAMILY ISLANDS WATER PROJECT

(BH-0025)

EXECUTIVE SUMMARY

GUARANTOR: The Government of The Bahamas

**BORROWER AND
EXECUTING AGENCY:** The Water and Sewerage Corporation

AMOUNT AND SOURCE: IDB-OC: US\$14.0 million
Local counterpart funding: US\$ 6.0 million
Total: US\$20.0 million

**FINANCIAL
TERMS AND
CONDITIONS:** Amortization period: 25 years
Disbursement period: 3 years
Interest rate: variable
Inspection and supervision: 1%
Credit fee: 0,75%
Currency: US\$ dollars under the
Single Currency Facility

OBJECTIVES: The overall objective of the project is to increase the efficiency and quality of service of the water sector in the Family Islands of The Bahamas through three types of actions.

First, the quality of service for several small systems in the Family Islands providing water to mostly low income areas will be improved by: (i) expanding existing wellfields and replacing rusted and severely obstructed storage tanks, transmission and distribution lines, and (ii) developing new sources of potable water either for settlements currently not covered or to attend expected growth in residential and tourism demands, avoiding in this way surpassing the safe yield of existing wellfields.

Second, the financial condition of WSC will be improved by increasing revenues, containing costs, and improving billing and collection practices.

Third, the project will develop feasible alternatives to deal with groundwater pollution problems and regulation of abstractions in New Providence and the Family Islands.

DESCRIPTION: The project has two components, which are described below:

Component A - Improvement of existing systems and coverage expansion (US\$13,98 million)

This component includes investments to improve a total of 13 small potable water systems in three islands: two systems in Abaco (Marsh Harbour and Treasure Cay), four systems in the southern part of Eleuthera, and seven systems in Exuma. These systems will serve in the year 2015 a total demand of 1,460 tig/day (450 tig/day existing in Marsh Harbour-Abaco plus 450 from new wellfield, 300 tig/day in Treasure Cay-Abaco, 164 tig/day in Exuma and 96 tig/day in Eleuthera), equivalent to a 60% increase over current daily production.

Component B- Institutional support(US\$1,6 million)

The objective of this component is to improve WSC operations by financing a new customer information system, a meter and related equipment replacement component, primarily in New Providence, a study to develop a strategy to better manage groundwater abstractions and pollution problems, and public information campaigns about the risk of using polluted groundwater resources.

Financial and Operational Measures Associated with the project

Parallel to project execution WSC and the government have agreed to take a series of measures to improve the financial position of the corporation. These measures are described in Chapter III. (See paragraph 3.9).

**ENVIRONMENTAL
REVIEW:**

Risks of pollution reaching new production wellfields due to increased sewerage are minor given the fact that all sewerage will be discharging at low levels and it will not flow towards the production wellfields; still, groundwater quality at the settlements may be affected by some small scale contamination. It is important to inform residents of the advantages of piped service and the risks of continue using existing wells for any direct consumption.

Risks of upconing of brackish or salt water are minimal due to the calculated safe spacing between wells; nevertheless wellfields should be monitored carefully during project operation to prevent any salt water intrusion problem. After project completion, the results of the monitoring program should be included in the yearly operation and

maintenance reports to be presented to the Bank for a period of 10 years starting on the date of the end of construction works. (See paragraph 3.19 and 323).

**POVERTY TARGETED
INVESTMENT:**

The percentage of poor in The Bahamas, defined as those with a monthly per capita income below \$95, is 9.975% therefore, to qualify as a PTI the head count ratio of poor beneficiaries should be at least 29.975%. Information from the 1994 "Labor Force and Household Income Report" was used to construct estimates of the head count ratio for the islands covered by the project assuming an average of 4 persons per household. The results of the analysis indicate that 9% of households would be below the poverty line; if all the "not stated" income group is considered below the poverty line as well, a total of 15% would be considered poor; therefore, this project can't be considered a PTI.

BENEFITS:

The investments considered in this project for the Family Islands are designed to complete WSC's quality improvement program in three of the largest islands. The 13 systems improved with the project will provide good quality water to over 21,600 business customers in the year 2015. This investments will help avoid the risks of having low income households tapping their own groundwater resources which can be contaminated. It should be noted also that these projects have been designed to have adequate production capacity such that very scarce good quality groundwater resources are not overexploited and destroyed as has happened in the past. In order to guarantee the sustainability of these investments, it has been agreed that a set of measures to improve the financial performance of these systems and the overall situation of the corporation have been agreed with WSC. Such that it can cover its operational and maintenance costs plus interest on its debt and a sizable proportion of its capital investment needs.

RISKS:

The sustainability of the project requires a sizable increase in revenues in New Providence and the Family Islands. Given the already high tariffs in New Providence, and the low income characteristic of the Family Island population such increases will require difficult political decisions for the government. Nevertheless, government accepts that revenues need to be increased and has decided to adjust tariffs once systems have been improved and customers receive water of acceptable quality.

PROCUREMENT:

Goods, services and works will be contracted using Bank procedures. Any call for bids for goods and

services exceeding US\$250,000 will require international public bidding. For works, the limit will be US\$1,500,000.

EXCEPTIONS TO BANK POLICIES: There are no exceptions to Bank's policies.

THE BANK'S COUNTRY AND SECTOR STRATEGY: The Bank's strategy for The Bahamas is to support the government's continuing efforts to restore sustained private sector-led growth by improving competitiveness, diversifying the economy, improving intersectoral linkages and strengthening environmental regulation and oversight of productive activities. A three pronged approach of policy dialogue, technical assistance and loan operations is being implemented. The Bank's operative program includes several TC operations to promote tourism sector diversification and improve intersectoral linkages. A TC operation under preparation will help implement the Public Utilities Commission, including preparation of guidelines for regulating activities, training and information systems. Private sector lead tourism development and other commercial activities will be fostered in the Family Islands by increasing financial sustainability and quality of water systems. As such, this project clearly falls within the objectives of Country Strategy.

SPECIAL CONTRACTUAL CONDITIONS: Conditions prior to first disbursement: None.

Other conditions:

- (a) Prior to awarding contracts for civil works, the borrower should submit to the Bank a plan with the schedule of measures approved by the guarantor which will be implemented in order to ensure that WSC operational revenue will cover its operation and maintenance costs by year 1999; its O&M costs plus interest on debt by year 2000; and O&M costs plus interest on debt, and at least 25% of depreciation costs by year 2002. The appropriate measures must be enacted upon by the borrower at least four months prior to the beginning of the affected year.
- (b) Increase its revenues per employee from a level of US\$51,000 in 1996 to a minimum of US\$77,860 in the year 2000, and to a minimum of US\$88,000 in the year 2002.
- (c) Within eighteen (18) months from the date of the signature of this Contract: (i) increase billing frequency such that billing occurs at least every two months, for all customers in The Bahamas;

(ii) implement measures to reduce accounts receivable turnover to a maximum of 120 days; and
(iii) implement information campaigns designed to make customers aware of the potential risks of using groundwater, based on information obtained through direct sampling of private wells and WSC water in New Providence and the Family Islands.

- (d) Within 12 months of loan signature the borrower shall: (i) demonstrate to the Bank that measures have been approved and implemented in order to have WSC comply with financial targets for years 2000 and 2002. (ii) inform the Bank of the status of compliance on commitments made by WSC to achieve financial targets for year 1999.
- (e) During project execution the borrower shall submit to the Bank as part of the semiannual progress report the results of the wellfields monitoring program.
- (f) The borrower shall submit to the Bank annually:
(i) the audited financial statements of the project during project execution; and (ii) WSC's audited financial statements during project execution and for an additional period of five years.

I. FRAME OF REFERENCE

A. Macroeconomic conditions

- 1.1 The Bahamas has a total population of about 285,000, 67% located in the island of New Providence, 16% in Grand Bahama (GB), and the rest in all the other islands collectively called the Family Islands. The islands included in this project (Abaco, Exuma and Eleuthera) comprise approximately 8.5% of the total population. Notwithstanding relatively high per capita gross domestic product (GDP) \$11,694 in 1997, there are strong indications of highly skewed income distribution among the islands. New Providence and Grand Bahama dominate tourism, which is by far the largest sector of the economy accounting for more than 50% of output and 60% of employment.
- 1.2 In the past four years there has been strong economic recovery from the recession of the early 1990s. The investment climate has improved as government simplified regulation for foreign direct investment, divested almost all the state-owned hotels and introduced competition in domestic air transportation. The Government is presently engaged in the process of divestment of telecommunications and have given indications that privatization of electricity will follow soon thereafter. The Government is also considering privatization of certain aspects of solid waste management, and has already introduced private sector participation in the production of water in New Providence and Grand Bahama.
- 1.3 Real growth in the economy has averaged 4% in the past two years, driven largely by strong growth of private investments and tourism performance. Current savings of Central Government has continued to be positive, but higher rates of public investment and salary increases prior to national elections in Fiscal Year 1996/97 (ending June) resulted in the overall deficit widening to 3.6% of GDP. Based on strong expenditure restraining measures taken, the performance for half year of FY 1997/98, shows a narrowing of the fiscal deficit by 25%. Performance subsequently indicates that the fiscal deficit is likely to be eliminated in FY 1998/99. Medium term prospects for the economy are very favorable given the conducive macroeconomic framework, and ongoing high levels of foreign direct private investment (10% of GDP in 1997) especially in hotels and related developments. The fiscal outlook is expected to be influenced by Government's sensitivity to maintaining their present investment grade (A3) credit rating in the international capital market and a debt management practice of limiting new debt to the extent of amortization payments in any one year. Public debt is extremely low at 34% of GDP, and the debt service ratio is manageable at 10%.

B. The water supply and sewerage sector in The Bahamas

- 1.4 The sector is under the direct responsibility of the Ministry of Public Works, which, in coordination with the Ministry of Health

and Environment formulates national sectoral policy. Potable water services are provided in Bahamas by the Water and Sewerage Corporation (WSC), three private utilities, and small franchises throughout the Family Islands. Besides these public piped services, approximately 30% of the population have individual household solutions (primarily wells) as their main source of water. Public sewerage services exist only for a small fraction of New Providence, portions of Grand Bahama and a community in Abaco.

- 1.5 WSC is an autonomous statutory agency established in 1976 to be responsible for the management and operation of governmentally owned water and sewerage systems in New Providence. In 1989 WSC took control of public systems in the Family Islands that had continued to be managed by a division of the Ministry of Public Works and Utilities after the 1976 reform. WSC looks like two distinct utilities operated by the same management: (i) New Providence, where service is provided to a relatively large urban area that guarantees some economies of scale and where a large part of the economic activities of the country are concentrated, and (ii) the Family Islands, a collection of islands where WSC operates numerous small systems in difficult conditions providing service to mostly low income areas of the country. A Public Utilities Commission (PUC) was established in 1993 to determine standards for the provision of public services and the rates to be charged. Although the PUC has not been made operational yet, current government policy calls for its implementation in the near future. The Bank is currently working in the design of a US\$1.5 million MIF operation to support the implementation of the PUC and strengthening the Environmental Science and Technology Commission. This MIF operation aims at making the PUC operational including the preparation of guidelines for regulating activities, organization staffing, training, budget and information systems. At the end of this operation it is expected that the PUC will have a trained staff, in-depth studies about the public utilities, and regulatory procedures.

1. Coverage of services

a. Family Islands

- 1.6 The inhabited islands of the Family Islands are spread over a distance of 400 miles from northwest to southeast and consist of islands larger than New Providence but with smaller populations spread on small settlements. WSC operates about 50 water systems on 13 islands with a total daily metered consumption of 1,110 tig ^{1/} and 8,600 accounts. The WSC's systems in the three islands included in this project, Abaco, Exuma and Eleuthera, had a daily average consumption of approximately 792 tig in 1995 and 5,858 active accounts. It is estimated that private wells provided

^{1/} TIG= thousand imperial gallons, which are equivalent to 4.5 cubic meters.

approximately 200 tig daily to more than 2,000 households in these islands. The figures above do not include GB, where water and sewerage systems administered by WSC were turned to the privately run Grand Bahama Utility Company (GBUC) in 1994. This utility serves 7,200 customers.

- 1.7 Several private franchises operate water services for small communities/tourist resorts in the Family Islands. In Abaco there are seven such water systems operating privately or under development, in Eleuthera there are four systems, two of which operate with a franchise agreement, and in Exuma there are several small systems that have no franchise agreements. In most of these cases the systems are operated by the managers of the respective resort area or private development, which frequently also operate small reverse osmosis plants to provide bottled water to their customers. A few bottled water companies have businesses in the Family Islands.
- 1.8 Daily consumption by households in the Family Islands is low. In Exuma and Eleuthera, daily averages in 1995 were between 75 and 85 igd, ^{2/} while in Abaco the average was 109 igd, a little higher than in New Providence. A series of factors explain these low consumption levels ^{3/}, and their relation to consumption in New Providence: (i) although average water tariffs (US\$4.02/tig) are about 1/4 of those in New Providence they are still several times higher than those paid by low income consumers in most Latin-American Countries (normally around US\$0.45 /tig), (ii) quality of service (pressure, salinity, reliability) is lower than in New Providence with the exception of Marsh Harbour, some areas of Eleuthera refurbished during 1996 and Andros, (iii) many settlements have groundwater resources readily available although water quality generally is a problem, and (iv) average per capita income in the Family Islands is also lower than in New Providence.
- 1.9 Sewerage services on the Family Islands are for the most part by septic tanks and latrines which leak into the underlying groundwater. Small communities forced to complement insufficient WSC supplies with their own local wells are certainly at risk, although the use of expensive bottled water for direct human consumption helps reducing potential health problems. Keeping customers on the public potable water systems is specially important for environmental and sanitary reasons. WSC recently assumed responsibility for a small sewerage operation and disposal facility at Spring City in Abaco. Large hotels and marina facilities employ package treatment plants.

b. New Providence

^{2/} IGD= Imperial gallons per day.

^{3/} Average consumption in Latin America varies between 250 and 300 igd per household

- 1.10 WSC is the single largest purveyor of water services on New Providence, with a total of approximately 30,000 active accounts and an average daily consumption of 3,470 tig in 1995. The Paradise Island Utility (PIU) provides water service to the Paradise Island, the New Providence Development Corporation (NPDC) serves 470 customers on the western portion of the Island and some hotels run their own RO plants. These private utilities satisfy a daily demand of approximately 2,600 tig. It is estimated that in 1995 some 15,000 private wells supplied 2,500 tig daily. WSC obtained its 1995 daily water needs from several sources: 4,254 tig were barged from the island of Andros, its own wellfields supplied approximately 2,300 tig, and 290 tig were purchased bulk from a private utility. A B00 contract with a private company that started operations in the second semester of 1997 will provide WSC up to two million igd from a reverse osmosis plant which will help improve quality of service. Several bottled water companies provide service in New Providence; the largest with a production capacity of over 100 tig/day also has business in some of the Family Islands.
- 1.11 The average daily water consumption by households in New Providence is 97 igd, while nonresidential customers have an average of over 600 igd/account representing approximately 45% of total consumption.
- 1.12 WSC is the primary provider of sewerage services in New Providence, with a total of approximately 5,700 active accounts, representing about 16% of the population. Effluent from sewerage treatment facilities (secondary treatment) is disposed in deep wells; sludge is either dried on-site and disposed at the landfill or trucked to a septage/sludge facility. Two private utilities operating in the Island provide the sewerage services in their areas. The remaining population is served by septic tanks and private haulers provide the service of cleaning these tanks and disposing the septage at a sludge facility. Many of the major hotels and resorts have their on-site sewerage package treatment and disposal systems, which utilize recycling for purposes such as lawn irrigation and flushing. Given the high number of individual sewerage solutions there is a high risk of contamination of groundwater resources used by households; as in the Family Islands, the risks are reduced by the common use of bottled water for direct human consumption.

2. Quality of service

- 1.13 Quality of service encompasses many aspects, from chemical, physical and bacteriological characteristics of water, to pressure, reliability and other features important to customers. Main current problems of WSC's systems arise from the age of the systems and the quality of water used as a source, which is made worst in most cases by the poor condition of storage tanks, transmission and distribution lines. In turn, the water quality deficiencies deteriorate and reduce the useful life of the infrastructure,

increasing water losses and creating low pressure problems beyond what would be typical in more benign environments.

a. Family Islands

- 1.14 Quality of service in the Family Islands is highly variable, with some of the 50 systems receiving water of acceptable quality at good pressure and others getting extremely poor service. The generalized low pressure level of most systems helps explain the (UFW) Unaccounted for water of 30%.
- 1.15 Of the systems included in this project, only Marsh Harbour/Abaco gets water of acceptable quality (salinity below 200 mg/l) ^{4/} but its wellfield cannot be expanded. The existing system in the resort area of Treasure Cay/Abaco has severe salinity and odor problems. Individual wellfields are the source of water for four systems in Eleuthera-South and seven in Exuma considered in this project, most of them producing water with salinity levels above 1,200 mg/l and some even above 2,000 mg/l. The Eleuthera-South systems are very old; some of the piping is more than 30 years old and some of the wells have been in operation for over 60 years. Piping of Exuma systems is between 10 and 30 years old, but storage tanks and other components are older, some of them installed in the early 1940's. Some of the wellfields are being overpumped and as a result water quality is deteriorating. A mains replacement program was completed in 1995 connecting all systems in Exuma so they could be supplied by a new wellfield.
- 1.16 The wellfields that will be developed with the project have water of good quality, with salinity levels between 50 and 250 mg/l at the operational depths, minor to none odor and no bacteriological problems were found during the field tests.

b. New Providence

- 1.17 Water sources used in New Providence have different salinity levels: Andros water has an average of 300 mg/l, New Providence wellfield has an average of 800 mg/l and water bought from NPDC is about 1200 mg/l. The RO plant recently contracted with the private sector will produce water with an average salinity below 50 mg/l, which will be used for blending, reducing chloride levels from more than 500 mg/l currently to approximate 350 mg/l.
- 1.18 The network in New Providence, which has 450 miles of transmission and distribution lines, is old and deteriorated. This situation is responsible for part of the high unaccounted for water (UFW) (52%) and low pressure in areas where pipes are severely obstructed, and in some cases it creates problems of color and rustiness making the water not suitable for laundry and reducing the useful life of

^{4/} The World Health Organization (WHO) recommended salinity levels for public services is 250 mg/liter of chlorides or lower.

fixtures and household appliances. A great deal of these deficiencies are being addressed by a project financed by the European Investment Bank that seeks to replace/upgrade approximately 42 miles of old transmission and distribution lines and rehabilitate storage tanks. These investments are expected to reduce UFW, increase water pressure in many areas and replace infrastructure components that affect water quality.

3. Institutional and financial aspects of WSC

- 1.19 WSC total staffing of 415 is divided between water services in New Providence (300) and Family Islands (96), and sewerage services in New Providence (19), which imply an average of 11 employees per 1,000 water connections. This relatively high ratio is due to the widely scattered nature of the system, the scarcity of water and low yielding wellfields, and the in-house provision of labor intensive activities such as meter reading and leakage control.
- 1.20 Until 1989 WSC covered all its operating expenses, including financial costs and 2/3 of its depreciation. Since 1990 financial results have shown deficits which can be explained by three factors: Firstly, the incorporation of the FI systems in 1989 contributed an overall deficit resulting from a specific government policy that kept tariffs at low levels for these systems. Government agreed at that time to make up for those deficits through fiscal transfers. Secondly, the cost of producing water is very high in the Bahamas due to the scarcity of good quality ground sources. It is estimated that when the current high level of UFW (52%) is taken into account water production costs in New Providence represent 2/3 of total operational costs. Lastly, and without doubt the most important factor, tariffs charged by WSC have not kept pace with costs. Tariff increases have been sporadic. In fact since WSC's inception, tariffs have been increased only three times: in 1978, 1982, and 1993.
- 1.21 Given the above situation, WSC has depended on current and capital transfers from government. For instance, in the last three years (1994 to 1996), transfers to the income statement amounted to an annual average of US\$1.9 million, representing approximately 9% of total annual revenues. Transfers for capital investments during the same period totaled US\$26.7 million, an important amount considering that it represents a 42% of total equity at the end of 1996. As first step to improve WSC financial situation Government capitalized in 1996 all of the company's internal debt and a Caribbean Development Bank (CDB) loan now being served by the Government, resulting in a reduction for the company of over US\$2.4 million in principal and interest payments. Further measures are being considered as part of this project.
- 1.22 The Financial and institutional studies conducted during project preparation identified several areas where progress could be achieved based on improving the flow of information and decentralizing part of the decision making process. The studies

recommended improving the customer information system to expedite the billing process, update the customer data base for sewer customers, introduction of credit card payments and several other measures which have been partially or totally adopted already by the corporation.

4. Water resources

- 1.23 The main source of water in The Bahamas is groundwater. The following table gives summary information about resource availability for some of the main islands in the country.

Freshwater Resources					
Island	Size (Acres)	Lens Area (Acres)	Lens area/Size	Volume (MIG) <u>5</u> /	Max. Daily abstraction (tig)
N. Providence	51,196	17,503	0.34	26,766	9,626
Abaco	415,345	116,280	0.28	274,444	79,070
Exuma	63,998	6,586	0.10	9,351	2,897
Eleuthera	127,996	16,569	0.13	32,626	8,133
Andros	922,575	338,585	0.367	957,111	209,922

- 1.24 These lenses are formed from percolating rain that collects as shallow bodies of water a few feet underground, floating above brackish and sea water. Due to the karstic nature of these aquifers their hydraulic properties are more variable than in regular aquifers. Yields are normally low and extraction has to take place over extended areas to avoid saline water intrusion. Average net recharge from precipitation varies from eight inches for Abaco and Eleuthera to six inches in Exuma and smaller quantities for Inagua and other islands in the southeastern portion of the country.

5/ MIG=Million imperial gallons, equivalent to 4,546 m³.

- 1.25 Wells and rain catchment systems 6/ are alternative sources of water for households with or without public piped services. Given the shallow nature of the aquifers they are exploited by many households. Besides piped public services and individual wells, few households have rain catchment systems. Typical investment costs for individual wells are in the order of \$1,500-\$2,000 while rain catchment systems require an investment in the order of \$12,000-\$40,000 depending on storage size and amount of roof work. Annual operating costs are approximately \$100 and are similar for both alternatives, which translates into \$2.7/tig. Total costs are in the order of \$8-\$10/tig for private wells, and above \$50/tig for rain catchment systems. Trucking services to places not covered by WSC or without groundwater resources typically charge about \$50/tig. Water from RO plants is of excellent quality but costs are high and heavily dependent on the scale of production; the RO plant that will be installed in New Providence will produce 2,000 tig daily water at a price of \$5.7/tig, while a smaller plant under study for the Island of Inagua could produce 35 tig at a price of \$31/tig. Companies supplying bottled water charge around \$0.7 per gallon and distribute directly to households.

C. Government policy in the sector

- 1.26 The main objective of government policy is to improve quality of service and expand coverage, particularly in the Family Islands. Risks posed by the widespread use of individual wells for the provision of water combined with the low coverage of sewerage can be reduced by expanding coverage of piped services and well designed information campaigns. Given the natural scarcity of water in The Bahamas and the small size of most systems cost of service is high. Nevertheless, the government is committed to increase tariffs once systems are rehabilitated to reflect the full costs of providing the service reducing cross subsidies by reducing the ratio of New Providence tariffs to Family Islands tariffs from a current level of four to a level close to two in year 2002, and achieve a sustainable financial position for WSC.

6/ A hydrological study conducted during the preparation of the project concluded that rain catchment systems could provide about 80 liters per day (17.8 imperial gallons) for typical design conditions in central Bahamas: roof catchment area of 500 ft², storage tanks of 750 ft³, annual precipitation 1,200 mm and reliability of 95%. This volume is less than 20% of typical daily household needs, even at the low average consumption rates common in The Bahamas. This result combined with the high cost of this water explains the low usage of this alternative (less than 5% of households in a survey conducted during the preparation of the project).

- 1.27 The government has been increasing the levels of private sector participation in the provision of water by way of privatizing specific activities like the shipping operation from Andros, and transferring WSC's systems of Grand Bahama to a private utility. The improvement of water quality in New Providence will be achieved in part through a BOO contract with Waterfields Co. which will provide about 1/3 of total daily needs in early 1998. It has been decided that full scale concession type arrangements would be considered only after similar changes have been accomplished for more easily privatizable services like electricity or telecommunications.

D. Participation of other international agencies

- 1.28 The Bank has yet to finance an operation in the water and sewerage sector in The Bahamas. The World Bank financed two operations in the previous two decades. The first one, done in collaboration with the CDB for US\$36.5 million, was approved in 1976 and completed in 1983, and helped alleviate a severe water shortage on New Providence which was a threat to the growth of tourism. The second one, done in collaboration with CDB and the European Investment Bank (EIB) for US\$33.5 million, was approved in 1988 and completed in 1994, and was used to rehabilitate the sewerage system and final disposal facilities, improve water quality and meet short term demands. The World Bank PCR for this project concluded that the main objectives of the project were generally met except for strengthening of the financial and management of WSC. Although financial improvements were limited, the World Bank expectations in the sector are considered to have been too high and unrealistic given the environment in which it operates. For this reason and given the strong performance in other key areas, the project was given an overall rating of satisfactory.
- 1.29 In 1993 the CDB lent US\$7.5 million to the Bahamian Government to finance a US\$11.3 million program for the expansion and rehabilitation of the Northern part of the Eleuthera water supply system. This project was completed in 1996. In December 1995 WSC received a loan from the EIB to finance the rehabilitation of storage tanks and a significant proportion of the water supply network in New Providence, with the explicit purpose of reducing water losses and improve the quality of service. Waterfields, the private company that subscribed a contract with WSC for the provision of water from an RO plant received a loan of \$1.0 million from the IIC (PR-146) in August 96.

E. Bank strategy

- 1.30 The Bank's strategy for The Bahamas is to support the government's continuing efforts to restore sustained private sector-led growth by improving competitiveness, diversifying the economy, improving intersectoral linkages and strengthening environmental regulation and oversight of productive activities. A three pronged approach of policy dialogue, technical assistance and loan operations is

being implemented. The Bank's operative program includes several TC operations to promote tourism sector diversification and improve intersectoral linkages. A TC operation under preparation will help implement the Public Utilities Commission, including preparation of guidelines for regulating activities, training and information systems.

- 1.31 Private sector lead tourism development and other commercial activities will be fostered in the Family Islands by increasing financial sustainability and quality of water systems. As such, this project falls within the objectives of Country Strategy.

F. Rationale for the project

- 1.32 WSC has been facing financial difficulties which have limited its ability to maintain and improve the quality of its services. Covering income statement deficits and providing equity contributions to WSC has become an important drain of public resources.
- 1.33 The solution to WSC financial difficulties will require a combined effort to increase quality of service so it can increase its revenue base, and at the same time reduce water losses and operational costs, in New Providence as well as in the Family Islands. The government is committed to increase tariffs once systems are rehabilitated and service is of good quality. Conditions in The Bahamas are such that high tariffs for low quality public piped service induce households to use their own groundwater with the associated health risks, given the low lying nature of these resources and generalized lack of sewerage service. At the same time, large hotels may find financially feasible to start operating their own RO plants whenever WSC tariffs are too high or its water doesn't meet their high quality standards, a situation that puts a cap on how high tariffs can go when they are used to cross subsidize low income customers. A reduced customer base in turn makes more difficult for WSC to be able to meet its financial targets.
- 1.34 The investments considered in this project for the Family Islands are designed to complete WSC's quality improvement program in three of the largest islands. These investments will help avoid the risks of having low income households tapping their own groundwater resources which can be contaminated. It should be noted also that these projects have been designed to have adequate production capacity such that very scarce good quality groundwater resources are not overexploited and destroyed as it has happened in the past.
- 1.35 The problems with quality of service in New Providence are being addressed with the project financed by the EIB designed to refurbish part of the transmission/distribution lines and storage tanks, and the BOO contract to obtain water of excellent quality from an RO plant. These investments will impose additional costs which will undermine the fragile financial stability of the New

Providence water system. Deficits for this system will be covered initially with government transfers and gradually would be passed to customers through tariffs. Experiences in 1997 seem to indicate that customers return to buy water from the corporation whenever service levels are improved.

- 1.36 In order to guarantee the sustainability of the investments included in the proposed project and given the financial deficit that the Family Islands operations currently represents for WSC, it has been agreed that a set of measures will be taken to improve the financial performance of these systems as well as the overall picture for the corporation. In that sense as part of the framework developed for the execution of this project, a contract between government and WSC will be signed formalizing government decisions to improve WSC financial situation, and WSC commitment to a set of measures to improve its efficiency. Part of the measures needed have been already taken; in particular, the government has relieved WSC from all internal long term debt reducing its principal and interest payments by US\$2.4 million yearly.
- 1.37 Besides the investment component, this project will allow WSC to develop a strategy to address the pending problem of groundwater pollution. Although increasing coverage of piped water services help reduce some potential problems associated with the lack of sewerage services, it is still very important to define a strategy and the investments required to solve this problem, specially for high density areas like New Providence.

II. THE PROJECT

A. Objectives

- 2.1 The overall objective of the project is to increase the efficiency and quality of service of the sanitation sector in Family Islands of The Bahamas through three types of actions.
- 2.2 First, the quality of service for several small systems in the Family Islands providing water to mostly low income areas will be improved by: (i) expanding existing wellfields and replacing rusted and severely obstructed storage tanks, transmission and distribution lines, and (ii) developing new sources of potable water either for settlements currently not covered or to attend expected growth in residential and tourism demands, avoiding in this way surpassing the safe yield of existing wellfields.
- 2.3 Second, the financial condition of WSC will be improved by increasing revenues, containing costs, and improving billing and collection practices.
- 2.4 Third, the project will develop feasible alternatives to deal with groundwater pollution problems and regulation of abstractions in New Providence and the Family Islands.

B. Program description

- 2.5 The project has two components, which are described below.
 1. Component A - Improvement of existing systems and coverage expansion (US\$13,98 million)
- 2.6 This component includes investments to improve a total of 13 small potable water systems in three islands: two systems in Abaco (Marsh Harbour and Treasure Cay), four systems in the southern part of Eleuthera, and seven systems in Exuma. These systems will serve in the year 2015 a total demand of 1,460 tig/day (450 tig/day existing in Marsh Harbour-Abaco plus 450 from new wellfield, 300 tig/day in Treasure Cay-Abaco, 164 tig/day in Exuma and 96 tig/day in Eleuthera), equivalent to a 60% increase over current daily production. These projects will serve an additional population of 6,300 and they will improve service to 3,700 people. Approximately 57% of the water produced will be consumed by commercial customers.
- 2.7 The investments in Abaco-Marsh Harbour will expand production by developing 17 wells on a new wellfield, including the required pumping capacity and 9,400 ft. of piping, standby power, chlorination facilities, transmission to existing storage, O&M equipment, and installing three new distribution pumps to replace the existing ones which are old and inadequate for future demands. Existing storage and transmission lines will not have to be expanded. The project in Abaco-Treasure Cay will develop a new 12

wells wellfield with a 430,000 gallon storage tank to replace the existing one; it includes also two distribution pumps (208 igpm) and a pneumatic tank, the necessary standby power, chlorination system and transmission lines (14,5 km) are included as well. No distribution network is included.

- 2.8 The investments in Eleuthera and Exuma are intended to finish a project to connect isolated unreliable systems spread over large areas to form a network in each island that can be served from new wellfields with better water quality and larger safeyields. The investments in Eleuthera include a new 306 acres, 190 wells wellfield, 102,000 gallon storage tank, standby power two (120 igpm) distribution pumps, a 4,200 gallon pneumatic tank, and a new 59,244 ft. distribution systems to serve the towns of Wemyss Bight, Waterford, Green Castle and Deep Creek.
- 2.9 The investments in Exuma include the development of two new wellfields (George Town and Forest) with a total of 545 acres and 336 wells and pumping stations that will serve jointly seven existing distribution systems from the settlement of Steventon in the north to Rolle Town in the south, covering almost 90% of the island. Investment includes also standby power, two storage tanks (162,000 and 84,000 gallon), four (130 igpm) distribution pumps, two pneumatic tanks (6,600 gallons and 3,600 gallons), chlorination facilities, 4,920 ft. of transmission piping and O&M equipment. The water mains, and service connections to effectively link the island from north to south were installed in 1995.

2. Component B - Institutional support (US\$1,6 million)

- 2.10 The objective of this component is to help improve some aspects of WSC operations. In particular, it includes the adquisition of a new customer information system, a meter and related equipment replacement, primarily in New Providence, a study to develop a strategy to better manage groundwater abstractions and pollution problems, and financing for public information campaigns about the risk of using polluted groundwater resources.
- 2.11 The new customer information system to be purchased with the project will be able to interact efficiently with meter activities and will help expedite the billing and collection activities, while providing a more reliable foundation for the Financial Information System. The metering replacement program includes purchase and installation of 2,000 meters, and 200 valves (6"), to replace existing ones not in working conditions.
- 2.12 The objectives of the environmental study are: (i) to develop a regulatory framework for groundwater abstractions and the necessary monitoring, enforcing mechanisms and institutional setup to actually implement it, and (ii) to carry out prefeasibility studies, of alternatives to deal with groundwater contamination, in New Providence and the Family Islands. The studies will involve the fieldwork necessary to collect information to perform the

technical, economic, financial and institutional analysis of the proposed pollution control alternatives.

- 2.13 The information campaigns will be designed to provide information to current and potential customers about the actual quality characteristics of water obtained from individual wells and from the public piped services. Water quality test of private wells and WSC water will be conducted for several populated areas of New Providence and the Family Islands and the results will be made available in newspapers and other public media. It is expected that this information will help consumers decide to connect back to public piped systems.

C. Cost and financing

- 2.14 The total cost of the program has been estimated at US\$20,000,000. The following table provides a breakdown by cost category and source of financing.

Consolidated Budget by Categories of Investment (In US\$ ' 000)				
Categories	IDB	Local	Total	% of Total
I. Administration and Supervision	2,500.0	200.0	2,700.0	13.5%
1.1 Engineering Studies	1,500.0	0.0	1,500.0	7.5%
1.2 Administration and Supervision	1,000.0	200.0	1,200.0	6.0%
II. Direct Costs	7,005.0	2,575.0	9,580.0	47.9%
2.1 Abaco	2,710.0	1,020.0	3,730.0	18.7%
2.2 Exuma	1,980.0	705.0	2,685.0	13.4%
2.3 Eleuthera	2,315.0	850.0	3,165.0	15.8%
III. Concurrent Costs	1150.0	2,150.0	3,300.0	16.5%
3.1 Environment Study	300.0	0.0	300.0	1.5%
3.2 Land Acquisition		1,700.0	1,700.0	8.5%
3.3 CIS Metering and Information Campaign	850.0	450.0	1,300.0	6.5%
IV. Financial Costs	1,340.0	200.0	1,540.0	7.7%
4.1 Interests	1,200.0	0.0	1,200.0	6.0%
4.2 Loan Commission	0.0	200.0	200.0	1.0%
4.3 FIV	140.0	0.0	140.0	0.7%
V. Unallocated Costs	2,005.0	875.0	2,880.0	14.4%
5.1 Cost Escalation	692.0	369.0	1,061.0	5.3%
5.2 Contingencies	1,313.0	506.0	1,819.0	9.1%
Total	14,000.0	6,000.0	20,000.0	100.0%
	70.00%	30.0%	100.0%	

1. Administration and supervision (US\$2,700 million)

2.15 This category includes the feasibility studies and supervision for both the Family Islands and the New Providence program and accounts for 13.0% of the total program costs.

a. Engineering Studies (US\$1,500 million). It includes the costs of the feasibility and design studies for the investments in the Family Islands, a study to review and provide recommendations about all WSC maintenance practices, and the designs for the New Providence investments which are being financed by the EIB. These studies have been concluded and financed by PPF 913/OC-BH.

b. Administration and Supervision (US\$1.2 million). Administration will be done by a WSC's project management unit.

Supervision has been contracted with the same firm responsible for the feasibility studies. This firm will provide support to WSC's Project Management Unit during project execution, including all aspects related to bidding, tendering and contracting out construction companies.

2. Direct costs (US\$9,580 million)

2.16 This category consist of all physical investments in the islands of Abaco, Exuma and Eleuthera and account for 50.4% of the total program cost. All costs were determined based on recent bids for similar projects in the Family Islands, in particular those costs related to laying pipes for the Caribbean Development Bank project in Eleuthera. The breakdown by island is the following:

- a. Abaco (US\$3.73 million). Consists of two projects, Treasure Cay and Marsh Harbour. The works consist of wellfield adaptations for US\$1,081 million (pumps, PVC pipes, valves, storage tanks, and electrical installations), pump stations and control systems for US\$524,000, transmission piping for US\$2.038 million and miscellaneous equipment for US\$87,000 (two computers, o&m equipment, two vehicles, and spare parts).
- b. Exuma (US\$2,685 million). Consists of two projects, Forest Glen and Georgetown. The works consist of wellfield adaptations for US\$2,189 million (pumps, PVC pipes, valves, storage tanks, and electrical installations), pump stations and control systems for US\$330,000, transmission piping for US\$110 and miscellaneous equipment for US\$56,000 (one computer, o&m equipment, one vehicle, and spare parts).
- c. Eleuthera (US\$3,165 million). Consists of one project at Eleuthera South. The works consist of wellfield adaptations for US\$1,266 million (pumps, PVC pipes, valves, storage tanks, and electrical installations), pump stations and control systems for US\$188,000, transmission piping for US\$1,667 million and miscellaneous equipment for US\$44,000 (one computer, o&m equipment, one vehicle, and spare parts).

3. Concurrent costs (US\$3,300 million)

- a. Environmental study (US\$0.3 million). Consist of a study to be developed by a consultant company to devise a strategy to deal with groundwater pollution and related activities to regulate groundwater abstractions. Preliminary terms of reference have been prepared already. The metering replacement program (US\$0.5 million) includes meters and valves to replace existing ones not in working condition.
- b. Land Acquisition (US\$1.7 million). Includes financing for the acquisition of approximately 850 acres of land required for the wellfields of Exuma and Eleuthera, with a cost of US\$1,090 million and US\$0.61 million respectively. These are privately

held vacant lots whose prices have been estimated at current market levels.

- c. An estimated US\$800,000 has been considered to provide a new (CIS) Customer Information System to the Water Corp. This amount includes the core CIS and other related software license fees, new hardware and training, installation and supports costs.

4. Finance charges (US\$1,540 million)

- 2.17 This category, which accounts for 8.1% of the total program cost, includes: (a) interest during the execution period; (b) the applicable credit fee; and (c) the Bank's inspection and supervision expenses for the program.

5. Unallocated costs (US\$2,880 million)

- 2.18 This category accounts for 15.4% of total costs and includes a provision for possible cost escalation and contingencies. Physical contingencies (\$1.82 million) were estimated for every project based on the estimated risks of having to increase the size of particular components; they represent approximately 9.7% of total costs.

D. Program financing

- 2.19 The Bank would contribute 70% of the total cost or US\$14.0 million from the ordinary capital, for disbursement in US dollars pursuant to the single currency option available pursuant to Bank policy.
- 2.20 The local counterpart funding of US\$6.0 million, or 30% of the total program cost, would be contributed by the Government of the Bahamas and transferred to WSC.
- 2.21 The following terms would apply to the proposed loan: (a) variable interest rate; (b) 0.75% credit fee; (c) 1% inspection and supervision fee; (d) 3-year disbursement period; (e) 3-year grace period; and (f) 25-year amortization period.

III. PROJECT EXECUTION

A. The Borrower, the Guarantor and the Executing Agency

- 3.1 The Guarantor will be the Government of The Bahamas. The Borrower and Executing Agency will be The Bahamas Water and Sewerage Corporation. The project will be executed by WSC through its Project Management Unit (PMU). This unit is under the engineering and construction assistant general manager, and is responsible for administering major capital works projects funded by the government of the Bahamas and outside international agencies. In this capacity, the PMU is currently commissioning or closing out several projects and will continue to be responsible for all new projects.

B. Status of preparation

- 3.2 All the designs have been completed and bidding documents have been prepared. The designs comply with generally accepted practices.

C. Arrangements for execution

- 3.3 Goods, services and works will be contracted using Bank procedures. Any call for bids for goods and services exceeding US\$250,000 will require international public bidding. For works, the limit will be US\$1,500,000. All contracting will be conducted by the PMU. The procurement plan and the schedule of public biddings are presented in Annex I.

1. Supervision

- 3.4 Supervision of construction of civil works will be done by the PMU through a consulting firm. The company that will perform these duties was responsible for the feasibility and final designs, and it was selected to carry out these studies through an international bidding process.

2. Construction works

- 3.5 The planned approach for the execution is to have one international bidding for the execution of the civil works: This bidding will include the provision of the required mechanical and electrical equipment for systems considered. The contractors will be required to prepare Hurricanes Preparedness Plans to protect their work and will be responsible for any damage by flooding during their construction activities.
- 3.6 The meters and valves for the replacement program will be purchased with a single bidding following Bank procedures. Installation of meters will be done with local contractors or WSC staff. The (CIS) Customer Information System will be purchased through an

International Competitive bidding that will include the provision of hardware and software, as well as training.

3. Studies

- 3.7 A consulting company will be hired during the first year of the project to carry out the environmental study. Draft terms of reference have been prepared already.
- 3.8 The information campaign will be carried out by the commercial department in consultation with the PMU based on water quality test conducted for this purpose. Areas to be tested include selected portions of New Providence as well as the Family Islands. Results of the tests will be published on local newspapers.

D. Financial and Operational Measures associated with the project

- 3.9 In order to improve the financial position of WSC and achieve a set of indicators as described in Section V.B.2, the government and WSC will assume a series of commitments, those are:
 - a. Approve a combination of tariff increases for WSC's operations in New Providence and the Family Islands that based on latest audited reports will guarantee WSC to achieve the following financial targets: (i) operational revenues cover operation and maintenance costs for year 1999; (ii) operational revenues cover operation, maintenance and interest on debt for year 2000; (iii) operational revenues cover operation, maintenance, interest on debt and at least 25% of depreciation costs by year 2002.
 - b. The reduction of total staffing by at least 30 in relation to staffing in 1996, such that it increases revenues per employee from a level of US\$51,000 in 1996 to a minimum of US\$77,860 in the year 2000, and to a minimum of US\$88,000 in the year 2002.
 - c. The implementation of billing procedures such that billing frequency is at least every two months, instead of quarterly, for all customers in The Bahamas, within 18 months after signing the agreement.
 - d. The implementation of procedures intended to reduce accounts receivables turnover, to a maximum of 120 days, from the current 195 days, within 18 months after signing the agreement.
 - e. The implementation of information campaigns designed to make customers aware of the potential risks of using groundwater. These campaigns will be based on information obtained through direct sampling of private wells and WSC water in particular areas of New Providence and the Family Islands, within 18 months after signing the agreement.

- 3.10 Prior to awarding the contract for civil works WSC should demonstrate to the Bank that measures have been approved and implemented to guarantee that financial targets for 1999 as described in 3.9a above will be achieved, and specific plans to achieve targets for years 2000 and 2002. A financial model with a similar level of disaggregation to the one used during project preparation should be used to conduct this analysis, and all information should be based on the latest audited reports at the time of the specific analysis.

E. Situation of lands, titles and rights of way

- 3.11 Land acquisitions will be necessary for the wellfields in Eleuthera and Exuma. Wellfields for all other systems are located on government owned land. The areas identified correspond to privately held lots currently vacant. Bank policies which require that fair prices be paid will be followed and their commercial costs have been considered in the project costs.

F. Execution schedule

- 3.12 The work program established shows that the project will be executed in a maximum of three years and the term for disbursement will also be three years, considering a construction period of 18 months.
- 3.13 The following table summarizes the project disbursements timetable, with figures in thousands of dollars, distinguishing by year and source of funds.

YEAR	IDB	LOCAL	TOTAL	%
1998	4,200.0	1,800.0	6,000.0	30.0%
1999	7,000.0	3,000.0	10,000.0	50.0%
2000	2,800.0	1,200.0	4,000.0	20.0%
TOTAL	14,000.0	6,000.0	20,000.0	100.0%
%	70.00%	30.00%	100,0%	

G. Recognition of expenses and retroactive financing

- 3.14 The expenses incurred previous to the loan contract were covered by a PPF loan established to cover: (a) the feasibility, final designs and environmental impact assessment for the investments in the Family Islands; and (b) the final design studies for investments in New Providence.

- 3.15 Those expenditures amount to US\$1.5 million. Therefore, the first disbursement of the financing should include the amount of resources spent from the PPF 913/OC-BH.

H. Operation and maintenance

- 3.16 Once construction is completed, the works will become part of the assets of WSC, which will have the responsibility to operate and maintain them at a technically acceptable level.
- 3.17 It is expected that WSC will have the required capacity to operate and satisfactorily maintain the new water systems. According to Bank's requirements, operating revenues will be sufficient to cover operating and maintenance expenses starting the first year of the project. Specific recommendations to improve WSC operation and maintenance activities were provided as part of the maintenance study including performance indicators and recommendations for allocation of resources, shifting focus from reactive to preventive measures. Key actions to be implemented or in the process of being implemented are: (i) a line flushing program (four water lines per week); (ii) a valve exercise program (39 valves per month); (iii) implement a preventive maintenance program that cover their facilities; (iv) training for personnel on safety; and (v) establish a certificate program for water supply operators, investment technician, maintenance technician and wastewater operator.
- 3.18 Three departments would be responsible for operation and maintenance of the works to be constructed. The PMU will hand over the completed new water systems to the Family Islands Operations department, who will be responsible for the scheduled and non-scheduled maintenance of the new systems. The Technical Support department will also lend support, especially in the areas of preventive maintenance, functional mechanical and electrical equipment and complex machinery.
- 3.19 To assure that the new water systems will be maintained satisfactorily, WSC will present an annual report to the Bank about the operation and maintenance of the systems under its control, for a period of 10 years starting on the date of end of the construction works.
- 3.20 The reports will have to be structured into separate sections containing specific information about each water system and about the results obtained concerning the saltwater wellfield protection programs, water quality delivered to the population, and information about customer complaints. The details of the saltwater intrusion monitoring and wellfield rotation protection programs has been established in the feasibility studies, following the existing norms and technical requirements. They specify that WSC should monitor the following variables at each new wellfield: water levels, water quality (conductance, chloride, total dissolved solids and temperature), wellfield pumpage and rainfall.

Similarly, a wellfield protection program should be established for each wellfield according to potential threats from facilities nearby.

- 3.21 The report will be submitted to the Bank within the first 120 days of every year during which WSC's obligation is in effect.

I. External audits

- 3.22 The project's financial statement during the period of project execution, and the WSC financial statements for a period five years longer than the project's execution period, shall be presented annually to the Bank. These statements shall be audited by an independent firm of chartered certified public accountants acceptable to the Bank.

J. Environmental issues

- 3.23 An Environmental Impact Assessment of the program was prepared. A summary was presented to the Environmental Committee of the Bank. Main findings are:

- (i) Risks of pollution reaching new production wellfields due to increased sewerage are minor given the fact that all sewerage will be discharging at low levels and it will not flow towards the production wellfields; still, groundwater quality at the settlements may be affected by some small scale contamination. It is important to inform residents of potential risks of continue using existing wells for any direct consumption and the advantages of piped service.
- (ii) The necessary clearance of vegetation has been minimized by locating transmission lines along existing roads and tracks; it is expected that the vegetation will restore relatively quickly.
- (iii) Risks of upconing of brackish or salt water are minimal due to the calculated safe spacing between wells; nevertheless wellfields should be monitored carefully during project operation to prevent any salt water intrusion problem.
- (iv) WSC will have to follow a strict monitoring program for all wellfields and the results of this program should be included as part of the semiannual progress report to be presented to the Bank, and after project execution it should be included in the yearly operation and maintenance reports.

- 3.24 The costs of preventive measures have been incorporated into project costs. An information campaign based on actual sampling of private wells and WSC water will be conducted with project

resources. Additionally, care has been taken during project design to include monitoring equipment and procedures to deal with salt water intrusion problems that could arise in spite of the safety factors considered for wellfield designs.

K. Monitoring and evaluation

- 3.25 The Bank will monitor the execution of the project through its country office in the Bahamas in collaboration with the project team. WSC will submit semiannual progress reports to the Bank. Should the Bank find progress to be unsatisfactory, WSC will be asked to submit, within 60 days of the Bank's request, the corrective measures to be adopted and the corresponding schedule for their implementation. Project team will undertake a midterm review mission during the second year of project execution.
- 3.26 The Bank will assess the results of the project execution within three months of the final loan disbursement, by means of a project completion report (PCR) that will be done by the project team, based on a draft to be prepared by the country office of the Bahamas.

IV. THE BORROWER AND EXECUTING AGENCY

A. The borrower and executing agency - The Water and Sewerage Corporation - WSC

1. Institutional considerations and organizational structure

- 4.1 The Water and Sewerage Corporation (WSC) is a statutory company, wholly owned by the government, which was created in July 1976. Currently, the WSC is overseen by the Minister of Public Works and is governed by a six-member board of directors including the Ministry of Public Works, a representative of the Ministry of Finance and four other members appointed by the Minister of Public Works. WSC is managed by a general manager (GM) who reports to the board. The general manager is assisted by a deputy general manager (DGM) and five individuals at the assistant general manager (AGM) level.
- 4.2 A strong separation between the New Providence and Family Islands operations remains as evidenced by the organizational structure with two separate divisions; the financial reporting system distinguishes these two areas.
- 4.3 The legal framework of the sector comprises The Bahamas Water and Sewerage Corporation Act; the Out Islands Utility Act; the Environmental Health Act; and the Public Utilities Commission Act.
- 4.4 In July 1993, the Parliament enacted the Public Utilities Commission Act which gave power to the minister of Finance to establish the Public Utilities Commission, and set forth its powers, duties and responsibilities. However the PUC has not been established yet pending decisions on privatization options for selected utilities. The Bank is currently involved in preparing a MIF operation which will assist the GOBH in establishing a fully developed legal and regulatory framework for energy, telecommunications, water and sewerage, and solid waste. The operation includes the preparation of operational guidelines for regulating utilities, organization, staffing, training, budget and information systems for the PUC.
- 4.5 It is expected that The Bahamas Water and Sewerage Corporation Act will be modified during 1998. The most salient features of the new bill are the following:
 - a. Section 44(1) of the bill requires that the WSC ensure that its revenues are not less than sufficient to meet all sums properly chargeable to its revenue account.
 - b. Concerning the control of water abstraction and use, the bill empowers the minister in charge of the WSC to declare that certain areas are "controlled areas", and that certain uses or

classes of uses are "controlled uses" or "controlled classes of uses". The effect of such declaration will be that no person or public authority can claim or obtain the right to abstract and use water and to construct works thereon, except in accordance with the bill. Section 44(1) of the bill gives individual land owner or occupiers the right to abstract water for domestic necessities or watering his livestock, subsistence garden, notwithstanding such declaration.

- c. The bill also addresses the issue of wastewater pollution control. The minister is empowered to designate controlled areas for the purpose of water pollution control. There are provisions whereby the minister is to make regulations for permits, terms of permits and their variation, suspension and revocation. This bill refers to the quality standards specified in the Environmental Health Act.
- d. The bill also addresses the matter of franchising/licensing. Section 11 of the bill provides that "the minister may grant concessions under this act subject to such terms and conditions as to geographical area, means of production, pressure, hygiene, charges, fees, inspection, reporting and accounting or other such matters as may be prescribed or mutually agreed between the minister and the concessionaire". The existing Water and Sewerage Corporation Act is silent on the matter of concessions and/or licensing. The Out Island Utilities Act allows developers in the Family Islands to make applications to construct water systems for use by the public.
- e. Section 3 of the Water and Sewerage Corporation Act, which is repeated in section 4(2) of the bill, declares that "all private rights in water shall be subject to the superior right of the government to control and administer the extraction, production, marketing and use of water from an entity. Justification also exists for implementation of some fee structure to any large user who abstracts ground water.
- f. In addition, the WSC retains the legal right to supply water to those within 600 feet of its lines. From a legal perspective, when the WSC is able to produce the quantity and quality of water it may legally reinstate those users, both residential and nonresidential, to its revenue and customer base, absent an agreement to the contrary between the WSC and such users.

a. Personnel

- 4.6 At the end of 1996 WSC had 415 staff, of which 19 were directly assigned to sewerage, 300 to New Providence water and the remaining to Family Islands operations, which imply a ratio of 11 employees per one-thousand water connections for New Providence and Family Islands combined. This result suggests excess staffing as compared to other well managed water utilities which have ratios ranging from three to six employees per one thousand connections. However,

there are a number of factors that have to be taken into consideration such as the widely scattered nature of systems in the Family Islands, the scarcity of water and low yielding wellfields, and the in-house provision of certain services such as the labor intensive meter reading and a leakage control unit of 16 people for reducing UFW.

- 4.7 WSC will start a program of not replacing 30 staff that will be retiring in the next five years, for which the company could reduce its personnel costs by over \$700,000.

b. Accounting-financial system

- 4.8 WSC has an accounting system which is gradually becoming fully automated. While previously financial data was separated between New Providence and the Family Islands on a consolidated basis, now WSC will be able to establish separate cost centers by Family Islands and by specific project.

c. Internal control

- 4.9 The internal auditor's office with a staff of four employees is responsible for reviewing all financial reports and auditing various accounting entries and registers. This office reports to the general manager and the department heads.

d. External audits

- 4.10 The financial statements of WSC have been audited since 1989 by the local office of an independent international accounting firm. The audited financial statements for 1995 meet the standards of the Bank.

e. Organizational and operational issues

- 4.11 The most salient organizational issues and specific recommendations identified in the financial and institutional study conducted during project preparation were the following:
- a. The need to decentralize and expedite the purchase order process.
 - b. Proper assignment of accountability to each manager.
 - c. The need to integrate and formalize the management information system.
 - d. The need for master planning, integrating facility needs with investment strategies, recognizing that the FI and NP operations require a different focus.
- 4.12 A common theme from the financial and institutional studies conducted during project preparation is that lack of appropriate

funding is causing hardship on WSC. With improved revenues should come better planning, a more responsive MIS, more accurate budgeting and accountability, better inventory stocking and streamlined purchasing, and overall gains in efficiency.

2. Financial analysis

- 4.13 The financial analysis was based on the audited financial statements for the years 1989 to 1996.

a. Financial results

- 4.14 Annex II shows the WSC income statements from 1989 to 1996, expressed in US dollars. Prior to 1990, WSC covered all its operating expenses, including maintenance and financial costs, as well as 2/3 of its depreciation costs. The incorporation of the Family Islands systems represented a sizable increase in costs (almost \$4.0 million) in comparison to its contribution to revenues (less than a million dollars), with the result that starting in 1990 WSC's financial balance was disrupted. This situation was created by the low tariff levels applied in the Family Islands as a result of specific government policies in that regard. Government agreed at that time to make financial transfers which in fact covered WSC's annual operational cash deficits.
- 4.15 There have been only three tariff increases since the creation of the corporation: in 1978, 1982 and 1993. The last increase raised the revenue level from US\$17.3 million in 1993 to US\$21.6 million in 1996, eliminating operating deficits in 1994 and 1995 before depreciation. This deficit appeared again in 1996 although at a much lower level (US\$1.4 million). WSC depends on government transfers to cover its requirements for financial expenses and investments needs.
- 4.16 WSC financial results are due basically to two factors: First, the cost of water production activities are very high in the Bahamas given the scarcity of good quality groundwater resources, the low yield of typical wellfields and the low population densities of islands. In the case of New Providence, given the high rate of UFW, production costs account for almost 2/3 of operating costs for the water system. Staff expenses as a whole have historically represented a significant portion of total expenses (47%) but their participation is projected to decline due to the influence of a staff retirement program and the increasing incidence of the RO water costs in New Providence.
- 4.17 The second factor is related to the lack of timely revision of tariffs. In fact it is estimated that if the current investment plan is maintained and tariffs continue at the present level, government cash transfers for operational and capital funding needs could jump to US\$13.1 million and US\$15.2 million in 1998 and 1999 respectively. This estimation takes into account operational costs

reductions already identified by the corporation, and the impact in revenues of new investments.

- 4.18 *Tariffs.* The WSC Act, section 6 (1) (h) provides that WSC shall have all the powers necessary for the carrying out of its functions and in particular, without limiting the generality of the foregoing, may prescribe and collect rates and service fees for the distribution and supply of water and sewerage. However, until a proposed PUC is operational, the WSC will retain the power to set the rates for water supply and sewerage services, subject to government's approval.
- 4.19 Current tariff structures, presented in Annex III, are characterized by a fixed charge, a free allowance (3 tig/quarter in NP and 2 tig/quarter in FI) and increasing block rates. In order to reduce desertion of high volume customers the NP water tariff for commercial costumers includes a reduction to \$14.2/tig for consumption above a 100 tig/quarter. The structure in the FI is such that residential customers (consumption below 13 tig/quarter) pay an average tariff per tig that is 10-20% higher than that paid by high volume commercial customers. Certainly there is room for improvements to the current tariff structures such that the subsidies of the block rate structure can be better focalized to low income customers.

b. Financial position

- 4.20 Annex IV presents selected items from the WSC balance sheets for the years 1989 to 1995. An analysis of these balance sheets shows the following:
- 4.21 The measure of the capacity to cover short term obligations has steadily declined throughout the years. This measure given by the ratio of current assets to current liabilities has decreased from 1.0 in 1989 to 0.4 in 1995. This decline in capacity is further supported by a deterioration in the latest years of end of year cash balances coupled with increases in bank overdrafts.
- 4.22 From the standpoint of equity, the contributed capital of the government has continued to grow in line with the growth in investments which had a net increase of about US\$39 million from 1989 to 1995.
- 4.23 From 1992 through 1994 WSC showed a favorable trend in terms of the number of days of receivables for net trade receivables: 204 days in 1992, 179 days in 1993 and 160 days in 1994. In 1995, however, the trend reversed and climbed to 192 days. This result reduces the capacity of the Corporation to cover short term obligations. Thus there is a need to improve collections. In this connection, actions being contemplated by the corporation include: (i) convert quarterly billing to at most every two months for all customers, (ii) expedite customer billing from the current three weeks lag between meter reading date and billing to three working days, (iii)

update customer database for sewer customers to ensure that they receive their billing, (iv) improve staffing capabilities in the credit and collection department, (v) acquire a new customer information system.

- 4.24 Accounts payable decreased from US\$25.5 million at the end of 1994 to US\$17.2 million at the end of 1995. This reduction was due to converting US\$8.2 million of Bahamas Electric Corporation accounts payable to long-term debt.

V. PROGRAM FEASIBILITY AND RISKS

A. Technical feasibility

- 5.1 The feasibility and design studies have been carried out in accordance with accepted engineering standards and principles. A review of maintenance activities was conducted during project preparation providing specific recommendations to improve current maintenance practices.
- 5.2 A great deal of attention was paid to the design of wellfields. The sustainable volumes of groundwater that can be extracted on an annual basis (safeyields) were estimated from the best available hydrological information. This information was combined with demand estimates for year 2015 obtained from actual consumption records to determine the required area of the wellfields. Lens thickness were established from electromagnetic induction surveys, and well pumping rates from the results of field tests and local experience. Given that the karstic nature of the aquifers in the islands makes impractical any attempt to develop mathematical models with the available information, test wells in all cases were spread out to cover most of wellfields. The design pumping rates were estimated to be those which generate a 0.1 foot drawdown at a distance of 75 to 150 feet away from the well and do not draw down the water table at the well by more than 5% of lens thickness, using the specific capacity derived from the less productive tests at each field. The number of wells was established based on a 24 hour-day operation, increased by safety factors between 10% and 50%.
- 5.3 Due to the uncertainty associated with the ultimate characteristics of aquifers, designs of wellfields will be finalized once a fraction of the production wells have been drilled and tested. The risks associated with this uncertainty has been minimized by using the wealth of information developed during the feasibility stage and by using conservative assumptions to determine the number of wells.
- 5.4 As wells were being drilled water samples were collected at 5-foot intervals and tested for conductivity, salinity, temperature, hydrogen sulfide odor and bacteriological properties. The analysis indicated that all projects will comply with WHO guidelines for potable water. Glass coated-bolted steel storage tanks of good corrosion resistance, located at wellfields, were sized to hold daily demands, and a maximum day factor of 1.5 was used to design transmission and distribution lines. UFW was assumed at current level of 30%. Pipes were sized to obtain at least a pressure of 10 psi at the end of the systems, incorporating the effect of hydropneumatic tanks, and were optimized to obtain the alternative with the least present value cost, considering pump operation and pipe costs.

- 5.5 The supervision of construction will be carried out by a team of engineers in the PMU, assisted by the same firm responsible for the feasibility and final designs. The schedule of execution has been estimated considering the characteristics of the works, the amount of time required for the final design, prequalification of contractors, and bid processing. The projects are simple in nature and no special difficulties are expected during the construction phase.

B. Financial and institutional viability

1. Institutional viability

- 5.6 WSC has the necessary staff to undertake the Family Islands program in conjunction with the EIB program for New Providence, given that the PMU has had similar experiences from previous projects financed by the World Bank and EIB. The PMU will be located under the engineering and construction department which reports directly to the general manager. This unit will be staffed by a project management coordinator; a consultant to the assistant general manager for the department; two engineers, one for each program; an administrative officer in charge of all tendering and contracting activities; a financial administrator that will liaise with the Bank for all required disbursements and reporting requirements; and a group of young trainees in engineering and finance to provide all the necessary assistance to the program coordinator.
- 5.7 The specific tasks of the PMU will be to manage the supervision contract; establish and maintain guidelines and procedures for project implementation; review and approve bidding documents prepared by the supervision consultants; approve payments to suppliers and contractors on receipt of appropriate documentation; solicit Bank disbursements when appropriate; manage WSC's counterpart funding with the government and establish a special cost accounting coding system for the project.
- 5.8 An international consulting firm will assist with the tendering, programming, supervision, and inspection of the construction stages of the project. Specific tasks will include, among other, to set up a detailed timetable for project implementation including methods, work organization, and management procedures; preparing bidding documents (to be approved by PMU and the Bank's Field Office); preparing terms of reference for hiring engineering and supervision consultants (to be approved by the PMU); assist the PMU in the bidding process (advertisement, logistics, etc.); monitoring progress of works; maintaining all project files and reports (invoices, correspondence, designs, drawings, agreements, payments, etc.); and preparing progress reports in coordination with PMU.
- 5.9 WSC is also in the process of overhauling its accounting system to make it totally automated. This will improve the corporation's decision making process when it starts receiving up-to-date and accurate information on a timely basis.

2. Financial feasibility

- 5.10 The investments under way, the BOO agreement (reverse osmosis) with the private sector, and the system rehabilitation and expansion are all aimed at increasing the acceptability of WSC's water services by the general public and large hotels. But these changes have additional costs that need to be borne by customers who, based on surveys undertaken both in the Family Islands and in New Providence, are willing to pay more as long as quality and service reliability are improved. Thus, potential increases in operating revenues and resulting decreases in government subsidies will come as a result of improvements that can be seen by the general population. These increases, however, will have to be gradual, considering willingness to pay as well as the availability of alternative supply sources, namely, private wells for residential customers and reverse osmosis plants for large qualitative sensitive commercial customers.
- 5.11 In line with the above, during project preparation a set of financial targets were developed to improve the WSC's financial results. These targets, indicated below, require the gradual increase in coverage of income statement cost items through operating revenues.
- a. Operating revenues to cover operation and maintenance costs by the year 1999.
 - b. Operating revenues to cover operation and maintenance costs plus the interest on debt by the year 2000.
 - c. Operating revenues cover operation and maintenance costs plus the interest on debt plus at least 25% of depreciation by the year 2002.
- 5.12 In accordance with the targets, WSC presented an action plan soon to be approved by the government. Such plan includes a tariff schedule that once approved by the Bahamian authorities, will be implemented. This schedule, as well as the agreed cost reductions measures, form part of the basis and assumptions used in preparing the projections presented in Annex V. In summary, these basis and assumptions are the following:
- a. The new tariff schedule becomes fully effective in year 1999.
 - b. Revenues increase by the gradual addition of 4,500 customers during the period 1997 to 2001.
 - c. A labor cost increase of 3% per annum coupled with labor savings for the reduction of 30 staff by the year 2002.
 - d. An increase in costs of US\$1.0 million in 1997 and of US\$4.4 million in 1998 and years thereafter resulting from the purchase of water from the RO plant. This increase, will be

coupled with savings of approximately US\$600,000 per year from the elimination of purchases from alternative sources and savings in operational costs. All variable costs were projected as a function of water production.

- 5.13 The Income Statement also contains a non operating revenue originating from transfers from the government of US\$4.4 million from year 1998 and thereafter (US\$1.0 million in 1997). Such transfers represent the government commitment to contribute US\$1.4 million in consideration of WSC taking over the Family Islands operation that runs at a deficit, and US\$3.0 million to cover the payment under the RO purchase agreement, amount that the RO project will not generate in the medium run.
- 5.14 For the cash flow projections only the investments corresponding to the EIB and IDB projects were considered. Apart from internally generated funds in the year that are present, the other sources of funds included in the project cash flow are the proceeds of the IDB loan and its corresponding government counterpart as well as the financing from EIB. The bottom line in the projected cash flow in Annex V "Funds Final (Deficit)/Availability" thus represents if negative, the additional contributory effort required from government and if positive, the remanent funds available to WSC for other investments after covering debt service and the above mentioned investments.
- 5.15 To measure the level of compliance with the above targets, three indicators were developed: for target (a) the indicator is the result of dividing operating revenues by operating and maintenance expenses; target (b) has the same numerator, but the denominator adds interest expenses to operating and maintenance; target (c) is similar to the preceding one except that the denominator includes 25% of depreciation. For the three indicators a result of 1 or more would then signify compliance with the established target. Since in every case the target's numerator is operating revenue the measurement of the targets is not affected by the US\$4.4 million transfers indicated above.
- 5.16 The following table (lines 1 to 3) shows the application of the above indicators to the projections. It also shows that these targets are fulfilled in the years required and years thereafter.

		1996	1997	1998	1999	2000	2001	2002
1.	Target a (%)	0.94	0.90	0.84	1.01	1.01	1.06	1.12
2.	Target b (%)	0.82	0.86	0.82	0.99	1.05	1.01	1.06
3.	Target c (%)	0.79	0.82	0.79	0.94	0.99	0.96	1.01
4.	GC (US\$000)	14.142	5.947	6.627	3.377	1.200	0	0
5.	DSCR (%)	0	0	15.5	174.8	235.2	120.2	176.9

5.17 In addition, the table shows in line 4 the trend in the level of total government contribution and in line 5 the Debt-Service-Coverage Ratio (DSCR) indicating the trend expressed in percentages, of WSC covering its debt with generated internal funds arising from Income Statement operations. In this regard, WSC is expected to cover its debt starting in year 1999. Moreover, apart from the Government transfers to operations indicated in paragraph 5.13, government contributions will decrease from US\$14.1 million in 1996 to zero in year 2001 and years thereafter in the projections.

5.18 An examination of the cash flow projections in Annex 5, indicate that once the plateau of US\$4.4 million in government transfers to operations has been reached, WSC will have annual remanents of US\$3.0 to US\$4.0 million for new investments.

5.19 In summary, should the basis used in the projections conform to reality in the future, WSC should be expected to: (a) Fulfill the targets agreed for the program; (b) cover its debts starting in 1999; (c) receive decreasing, but still needed level of government transfers; and (d) to have cash flow balances for new investments from the year 2001. While these aspects are an improvement from the present situation, the high level of depreciation will affect the income statement with resulting material losses until year 2001.

C. Economic feasibility

5.20 The economic feasibility of each project was analyzed using demand functions estimated for this purpose. Traditional problems in water demand estimation were tackled in the following manner:

- a. Statistical tests confirmed that prices, either marginal or average, are endogenous and so they could not be used directly in demand estimation, a typical problem with block rate tariff structures as the ones existing in Bahamas. An instrumental variable approach was followed to construct the price variables used in all estimation procedures.

- b. As it is not clear whether average or marginal prices should be used in demand estimation of goods bought under a block rate pricing structure, a statistical procedure was used to identify the price perceived by consumers. Based on the results of these tests and the need to simplify the welfare analysis, the average price was used.
- 5.21 The demand functions were estimated using maximum likelihood techniques combining information from first quarter-1996 consumption data for a cross-section of WSC customers in New Providence and the Family Islands (necessary in order to better estimate price effects) and the results of a contingent valuation (CV) exercise conducted during project preparation for the same group of customers.
- 5.22 The econometric estimates indicate that price elasticity could be around -0.17, and income elasticity between 0.1 and 0.2. An aggregate analysis of the results obtained from the 1993 tariff increase suggest a price elasticity of -0.2 for New Providence and -0.15 for the Family Islands; the economic analysis below was conducted with values of -0.2 and -0.25 to be conservative on the benefits side.
- 5.23 Price elasticities were used to build double logarithmic demand functions from current consumption-price levels. In order to estimate welfare gains for projects that would improve quality of service, it was assumed that demands shift 25% out horizontally, the minimum horizontal difference observed today between systems with quality similar to the one that will be provided by these projects (Marsh Harbour) and actual consumption in Eleuthera and Exuma. A cutoff price at levels similar to those observed for trucking services was used to truncate above the demand functions. Demand growth was assumed equal to historical population growth for every island, ranging from 3.3% in Abaco to 1.04% in Eleuthera and Exuma.
- 5.24 The results of the analysis are summarized in the following table:

Project	Cost	O&M/year	Capacity	IRR	IRR,2	IRR,3	Notes
	\$000	\$000	tig/year	%	%	%	
Marsh Harbour	972.0	45.0	168,000	31.4	25	28.2	No Quality improvement
Treasure Cay	3,275.5	67.50	106,820	27.3	24.5	23.1	25% shift in demand
Eleuthera	4250.	44.2	35,000	13.7	10	12	25% shift in demand
Exuma	4178.0	51.5	60,000	12.1	10.2	10.2	25% shift in demand
Crossing Rock	438,501	16.1	2,725	3.3	2	2	25% shift in demand
Casuarina Point	414,158	16.05	3,382	6.1	5	4.3	25% shift in demand
Inagua	1,371,688	127.05	12,794	18	15	13	No quality improvement
TOTAL	14,899		306,969				

IRR: price elasticity -0.2 and costs from feasibility studies.

IRR,2: price elasticity of -0.25 IRR,3: Project costs up by 20%.

- 5.25 The results above indicate that the projects in Marsh Harbour, Treasure Cay, Exuma, Eleuthera and Inagua are economically feasible. The IRR for projects in Eleuthera and Exuma will fall below 12% for cost increases of 20%; nevertheless they are included given that the base cost already includes a margin of 15% for contingencies. The projects for Crossing Rock and Casuarina Point have IRR well below 12% for all scenarios used in the economic analysis and for that reason are not included in the project. The Inagua system would be developed through an arrangement with the private sector and for that reason it is not included in the project.

D. Distributional impact

- 5.26 The criteria to define a project as poverty targeted investment (PTI) is that it benefits a population where the percentage of poor either exceeds the country average by 20 percentage points, or is greater than 50%, whichever is smaller. The percentage of poor in The Bahamas, defined as those with a monthly per capita income below \$95, is 9.975%; therefore, to qualify as a PTI the head count ratio of poor beneficiaries should be at least 29.975%.
- 5.27 Information from the 1994 "Labor Force and Household Income Report" was used to construct estimates of the head count ratio for the islands covered by the project assuming an average of 4 persons per household. The results at the analysis indicate that 9% of households would be below the poverty line; if all the "not stated" income group is considered below the poverty line as well, a total

of 15% would be considered poor; therefore, this project can't be considered a PTI.

E. Project risks

- 5.28 The sustainability of the project requires a sizable increase of revenues in New Providence and the Family Islands. Given the already high tariffs in New Providence, and the low income characteristic of the Family Islands population such increases will require difficult political decisions for the government. Nevertheless, government accepts that revenues need to be increased and it is decided to adjust tariffs once systems have been improved and customers receive water of acceptable quality.

PROCUREMENT PLAN

		Financing US\$ 000			Type of Bidding	Publication Trim/Year
Number	Description	BID	LOCAL	TOTAL COST		
1	Construction and procurement of mechanical and electrical equipment for water systems in Abaco.	2,710	1,020	3,730	ICB	II/98
2	Construction and procurement of mechanical and electrical equipment for water systems in Eleuthera and Exuma.	4,295	1,555	5,850	ICB	III/98
3	Procurement and installation of meters and valves.	245	105	350	ICB	III/98
4	Environmental Study	300	0	300	ICB	IV/98
5	Customer Information System	605	195	800	ICB	IV/98

SCHEDULE OF PUBLIC BIDDINGS

Schedule of Public Biddings														
Description	Year 1				Year 2				Year 3				Cost (US\$ 000)	
1. Construction and procurement of mechanical and electrical equipment for water systems in Abaco.		I	I	E	E	E	E	E					3,730	
2. Construction and procurement of mechanical and electrical equipment for water systems in Eleuthera and Exuma.			I	I	E	E	E	E	E	E			5,850	
3. Procurement and installation of meters and valves.			I	I	E	E	E	E					350	
4. Environmental Study				I	I	E	E	E	E				300 C Inf. Systems (800)	
5. Customer Information System				I	I	E	E	E	E				800	
I : International Competitive Bidding E: Execution														

WSC PROJECTED PROFIT AND LOSS STATEMENT
(in thousands of US dollars)

	1996	1997	1998	1999	2000	2001	2002
Operating Revenues	22,001	22,500	23,577	28,449	30,844	32,213	33,975
Operating Expenses, net of RO&Dep.	22,968	23,527	23,756	24,353	25,109	25,825	26,435
Staffing	10,632	11,193	11,424	11,659	11,898	12,115	12,360
Water Purchase	5,134	4,788	4,931	5,079	5,231	5,388	5,550
Repairs	1,429	1,455	1,482	1,510	1,579	1,610	1,642
Bad Debts	477	477	477	477	477	477	477
Other (*)	5,296	5,614	5,441	5,628	5,923	6,234	6,410
Operating Income before RO&Dep	-967	-1,027	-179	4,096	5,735	6,388	7,540
Reverse Osmosis costs	0	114	4,162	4,162	4,162	4,162	4,162
Operating Inc. before Depreciation	-967	-1,141	-4,341	-67	1,572	2,226	3,378
Depreciation	4,771	4,948	4,943	5,904	6,124	6,213	6,277
OPERATING INCOME (LOSS)	-5,737	-6,089	-9,285	-5,971	-4,552	-3,987	-2,899
Interest Expenses	3,209	1,440	1,573	1,703	1,518	1,961	1,755
Other Income (*)	2,881	0	0	0	0	0	0
NET INCOME	-6,065	-7,529	-10,858	-7,675	-6,070	-5,948	-4,654

* Includes Variable costs, G&A and Miscellaneous fixed costs

** For 1996 includes Exchange Gain and other non-operating one-time income (e.g. BEC settlement) WSC

CURRENT WSC WATER TARIFFS

	Fixed Charge (\$)	Free Allowance (tig/quarte r)	Up to 13 tig/quarter (\$)	From 13 to 26 tig/q (\$)	From 26 to 100 tig/q (\$)	> 100 tig/q (\$)
NP residential	30	3	10,60	17,60	17,60	14,26
NP commercial	40	3	11,20	19,20	19,20	14,26
Family Islands	15	2	2,30	2,90	4,00	4,00

WSC PRINCIPAL BALANCE SHEET ITEMS

(In thousands of US\$)								
	1989	1990	1991	1992	1993	1994	1995	1996
Current Assets	10,246	9,497	10,819	14,352	11,885	12,918	14,170	13,586
Cash	406	1,098	702	3,790	2,111	1,095	2,112	521
A/R Net	8,291	6,992	8,725	9,306	8,480	10,500	12,412	12,028
Other	1,549	1,407	1,392	1,256	1,294	1,323	1,093	1,037
Fixed Assets	73,034	80,139	89,673	95,036	98,976	104,530	114,090	119,125
Current Liabilities	9,853	13,894	27,798	26,368	28,693	35,561	29,689	30,289
Bank O/D	589	1,868	3,320	3,008	3,247	4,574	5,520	4,405
Other	9,264	12,026	24,478	23,360	25,446	30,987	24,169	25,884
Long Term Debt	26,907	30,924	37,741	36,850	35,013	35,163	50,087	40,219
Equity	46,520	44,818	34,953	46,170	47,155	46,724	49,930	62,200

THE BAHAMAS. FAMILY ISLAND WATER PROJECT (BH-0025)
BASIS AND ASSUMPTIONS FOR THE WSC PROJECTIONS

I. INCOME STATEMENT

A. Operating Revenues

- 1.1 The WSC proposed tariff structure presented to the Bank was applied to a database of customers classified by current consumption levels which were adjusted taking into account price elasticity and average percentage increase in tariffs. The projection includes 4,500 customers to be added to the cadastre during the period 1997 to 2001 as a result of information campaigns and infrastructure improvements in New Providence.

B. Operating Expenses

- 1.2 Represents the addition of several cost categories, namely, staffing, water purchases, repairs, bad debts, and other. **Staffing** was estimated considering an annual inflation rate of 3% and taking into account WSC's plans for personnel reduction. **Water Purchases** contains the estimated cost of purchases prior to 1998 from the New Providence Development Corporation, and the cost of shipping water from the island of Andros. The corresponding values are based on recent historical experience. After 1998, when the Reverse Osmosis (RO) Plant comes into effect, the projection includes its cost based on contractual agreements, but adjusting the total cost of water purchases by eliminating sources to be replaced by the RO Plant. **Repairs**, a variable cost, was projected as all variable costs for WSC as a function of water volume produced. **Bad Debts** was projected on the basis of recent historical experience. **Other**, consists of a series of items such as contractual services, chemical, electricity and fuel costs, usually projected as a function of water produced. **Depreciation Expense** was based on schedules by type of assets. The usual method of depreciation is straight line. **Interest Expense** was based on the respective amortization schedules for the various loans.

II. CASH FLOW

- 2.1 **Debt Service IDB Program:** was projected on the basis of its amortization schedule developed by the project team.
- 2.2 **Debt Services Other Programs:** reflects the amortization schedules for the other loans.
- 2.3 **Government Contribution for Operations:** in the amount of US\$4.4 million consists of two parts: US\$1.4 million that the

government has agreed to continue transferring as a result of WSC taking over the Family Islands operations which runs a deficit. The second part US\$3.0 million arises from the Government agreement to transfer this amount to WSC to cover the payment required under the BOT contract for the RO Plant, amount that can not be obtained in the middle term solely from the operation of that project.

- 2.4 **Investments:** The projection contains investments in course and those under the EIB and IDB Programs. Their level reflects the investments plans in effect. Investments after year 2001 are assumed to be selected from a set of projects with engineering studies based on their financial viability as obtained in the bottom line of the cashflow statement.
- 2.5 **Financing:** The annual amounts for IDB and its Government counterpart correspond to those in the project cost table prepared by the Project team.
- 2.6 The cash flow bottom line "**Funds Final (Deficit)/Available**" if negative represents the additional contributory effort required from the Government; if positive represents the remanent funds left after covering debt service and investment with funds internally generated, and from loans and government contributions.

BAHAMAS CF

BAHAMAS WATER AND SEWERAGE CORPORATION PROJECTED CASH FLOW (In US\$ Thousands)												
	1996 Actual	1997	1998	1999	2000	2001	Subtotal 1998/2001	2002	2003	2004	2005	Total
Profit/	(5,138.0)	(7,729.0)	(5,697.0)	(1,927.0)	(371.0)	(1,490.0)	(9,485.0)	69.0	23.0	(66.0)	(45.0)	(9,500.0)
Association	4,771.0	4,948.0	4,943.0	5,904.0	6,124.0	6,213.0	23,184.0	6,277.0	6,370.0	6,431.0	6,441.0	48,700.0
Test	3,209.0	1,440.0	1,230.0	1,065.0	820.0	2,235.0	5,350.0	2,000.0	1,802.0	1,614.0	1,434.0	12,200.0
Use												
Internally	2,842.0	(1,341.0)	476.0	5,042.0	6,573.0	6,958.0	19,049.0	8,346.0	8,195.0	7,979.0	7,830.0	51,300.0
ated												
s												
ue from	620.0	-	-	-	-	-	-	-	-	-	-	-
tions												
L Funds	3,462.0	(1,341.0)	476.0	5,042.0	6,573.0	6,958.0	19,049.0	8,346.0	8,195.0	7,979.0	7,830.0	51,300.0
tions												
ing	4,392.0	0.0	-	-	-	-	-	-	-	-	-	-
cal												
rements												
L Funds												
Debt	(930.0)	(1,341.0)	476.0	5,042.0	6,573.0	6,958.0	19,049.0	8,346.0	8,195.0	7,979.0	7,830.0	51,300.0
rcs and												
stments												
Service						1,596.0	1,596.0	1,552.0	1,501.0	1,463.0	1,418.0	7,500.0
Program												
Service	7,164.0	3,701.0	3,069.0	2,885.0	2,795.0	4,193.0	12,942.0	3,165.0	3,145.0	3,126.0	1,804.0	24,100.0
c												
rams												
Debt	7,164.0	3,701.0	3,069.0	2,885.0	2,795.0	3,780.0	14,538.0	4,717.0	4,046.0	4,589.0	3,222.0	31,700.0
ce												
able	(8,094.0)	(5,042.0)	(2,593.0)	2,157.0	3,778.0	1,169.0	4,511.0	3,629.0	3,549.0	3,390.0	4,608.0	19,600.0
stments												
al Cash	2,112.0	-	-	-	-	-	-	-	-	-	-	-
able	(5,982.0)	(5,042.0)	(2,593.0)	2,157.0	3,778.0	1,169.0	4,511.0	3,629.0	3,549.0	3,390.0	4,608.0	19,600.0
stments												
stments	8,432.0	8,706.0	17,282.0	12,534.0	7,717.0	-	37,533.0	-	-	-	-	37,533.0

	1996 Actual	1997	1998	1999	2000	2001	Subtotal 1998/2001	2002	2003	2004	2005	Total
Governmental Transfers	(14,414.0)	(13,748.0)	(19,875.0)	(10,377.0)	(3,939.0)	1,169.0	(33,022.0)	3,629.0	3,548.0	3,390.0	4,808.0	(17,803.0)
Financing	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	4,200.0	7,000.0	2,800.0	-	14,000.0	-	-	-	-	14,000.0
	272.0	7,801.0	9,048.0	-	-	-	9,048.0	-	-	-	-	-
Intn. Contrib. Year	7,657.0	-	-	-	-	-	-	-	-	-	-	-
Intn. Cooperation Prog.	-	-	1,800.0	3,000.0	1,200.0	-	-	-	-	-	-	-
Financing	7,929.0	7,801.0	15,048.0	10,000.0	4,000.0	-	23,048.0	-	-	-	-	14,000.0
Final Profit/ Loss	(6,483.0)	(5,947.0)	(4,827.0)	(377.0)	61.0	1,169.0	(3,974.0)	3,629.0	3,548.0	3,390.0	4,808.0	(3,803.0)
Service to (%)	-	-	15.5	174.8	235.2	120.2	-	176.9	176.4	173.9	243.0	-
Government Contribution	14,142.0	5,947.0	6,627.0	3,377.0	1,200.0	0.0	-	-	-	-	-	-

Does not include Government transfers for operations of US\$4400 for year 1998 and thereafter reflected in the Income Statement

BAHAMAS PG
BAHAMAS. WATER AND SEWERAGE CORPORATION
PROJECTED INCOME STATEMENT
(In US\$ Thousands)

	1996 Actual	1997	1998	1999	2000	2001	Subtotal 1998/2001	2002	2003	2004	2005	Tot 1998/
Operating Revenue	21,569.0	22,500.0	23,577.0	28,754.0	31,145.0	32,264.0	115,740.0	34,297.0	34,972.0	35,608.0	36,315.0	256,991.0
Operating Expenses	22,968.0	24,869.0	27,918.0	28,506.0	29,261.0	29,977.0	115,662.0	30,590.0	31,379.0	32,195.0	33,040.0	242,875.0
Operating Before Depreciation	(1,399.0)	(2,369.0)	(4,341.0)	248.0	1,884.0	2,287.0	78.0	3,707.0	3,593.0	3,413.0	3,275.0	14,116.0
Depreciation	4,771.0	4,948.0	4,943.0	5,904.0	6,124.0	6,213.0	23,184.0	6,277.0	6,370.0	6,431.0	6,441.0	48,783.0
Operating Income	(6,170.0)	(7,317.0)	(9,284.0)	(5,656.0)	(4,240.0)	(3,926.0)	(23,106.0)	(2,570.0)	(2,777.0)	(3,018.0)	(3,166.0)	(34,667.0)
Operating Income Before Taxes	620.0						-					
Interest Income						959.0	959.0	915.0	864.0	826.0	781.0	4,345.0
Interest Income Before Taxes												
Interest Income Before Taxes	3,209.0	1,412.0	813.0	671.0	531.0	1,005.0	3,020.0	846.0	736.0	622.0	498.0	5,721.0
Change in Gains	1,021.0						-					-
Income Before Taxes	(7,738.0)	(8,729.0)	(10,007.0)	(6,327.0)	(4,771.0)	(5,890.0)	(27,085.0)	(4,331.0)	(4,377.0)	(4,465.0)	(4,445.0)	(44,792.0)
Income Before Taxes												
Income Before Taxes	2,600.0	1,000.0	4,400.0	4,400.0	4,400.0	4,400.0	17,600.0	4,400.0	4,400.0	4,400.0	4,400.0	35,200.0
Income Before Taxes	(5,138.0)	(7,729.0)	(5,607.0)	(1,927.0)	(371.0)	(1,490.0)	(9,485.0)	69.0	23.0	(65.0)	(45.0)	(9,592.0)
Net a b	0.94	0.90	0.84	1.01	1.06	1.08	1.00	1.12	1.11	1.11	1.10	1.08
Net b c	0.82	0.86	0.82	0.99	1.05	1.01	0.97	1.06	1.06	1.06	1.06	1.02
Net c d	0.79	0.82	0.79	0.94	0.99	0.96	0.92	1.01	1.01	1.01	1.01	0.97

LOGICAL FRAMEWORK

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
GOAL			
Increase sustainability and quality of water service in the Family Islands	Water consumption from public piped services. Households expenditures on water.	Statistics provided by WSC. Household surveys	Financial and Operational measures reflected in consistent policy management.
PURPOSE			
1. Improve quality of public water service for several small settlements in the Family Islands	Production capacity of systems included in the project are: 450 tig/day for new wellfield in Marsh Harbour-Abaco, 300 tig/day for Treasure Cay-Abaco, 164 tig/day in Exuma and 96 tig/day in Eleuthera. Salinity levels for all water systems in the project are below WHO recommended level of 250 mg/lit.	Semiannual reports prepared by WSC during project execution. Site visits by IDB staff.	Operation, maintenance of works is adequate. WSC customers in Family Islands substitute poor quality wellwater by WSC provided water.
2. Increase financial autonomy of WSC	Level of Government transfers reduced by US\$ 22,0 million for the period 1999-2002. Expected level of government transfers for operating and capital expenditures steadily decline to less than US\$ 4.5 million by 2002 per year.	Financial projections prepared by WSC financial department.	Government policy implemented towards public utilities continues to emphasize their financial sustainability and efficiency gains.
3. Initiate removal of groundwater pollution	Decision to pursue studies at feasibility level	Dialogue with sanitary authorities of the country	Follow up actions adopted.
OUTPUTS			
1. 13 small potable water systems in the islands of Abaco, Exuma and Eleuthera expanded or completely renovated.	Substantial Completion Certificate issue for construction activities in Abaco, Exuma and Eleuthera.	Semiannual reports prepared by WSC during project execution. Site visits by IDB staff.	Civil works perform as expected. WSC operates and maintain works as programmed.

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
OUTPUTS			
2. WSC internal funds generation increased to cover financial expenses plus at least 25% of depreciation costs by year 2002.	<p>2.1 WSC working ratio equal or smaller to 1.0 for year 1999.</p> <p>2.2 WSC working ratio equal or smaller than 0.95 for year 2000.</p> <p>2.3 WSC working ratio equal or smaller than 0.9 for year 2002.</p>	<p>Financial projections prepared by WSC staff using latest audited reports at the following dates: i) prior to first disbursement, ii) 12 months after signing the contract, iii) in the middle of year 2001.</p> <p>Audited financial statements submitted by WSC at the end of every year, up to 5 years after completion of the project.</p>	<p>Government policy towards public utilities continues to emphasize financial sustainability and efficiency gains.</p> <p>WSC capital expenditures for purpose other than the IDB project and the EIB project is at most US\$750,000.</p>
3 A set of alternatives to deal with groundwater pollution problems in New Providence and the family Islands.	A final report acceptable to WSC and to the Bank.	Report submitted to IDB country offices.	Alternatives identified are technically, environmentally, financially and economically feasible.
ACTIVITIES			
1.1 Expand water production in Marsh Harbour (Abaco) by developing a new 17 wells wellfield, the required pumping capacity, standby power, chlorination facilities, transmission to existing storage and 6 new distribution pumps.	US\$750,000 expenditures on direct costs.	<p>Semiannual reports prepared by WSC during project execution.</p> <p>Site visits by IDB staff.</p>	<p>Local counterpart funds are available.</p> <p>Construction contracts are carried out as planned.</p>
1.2 Develop a new 12 wells wellfield for the Treasure Cay system with a 430,000 galloon storage tank, 4 distribution pumps, standby power, chlorination system and 14.5 km transmission line.	US\$2,980 expenditures on direct costs		

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
ACTIVITIES			
1.3 Develop a new potable water system to serve the towns of Wemyss Bight, Waterford, Green Castle, and Deep Creek in South Eleuthera, including a 177 wells wellfield, 102,000 gallon storage tank, a 4,200 pneumatic tank, small operation and maintenance equipment and a 59,244 ft. distribution system.	US\$3,165 spent on direct costs and US\$612,00 spent on land acquisition.	Semiannual reports prepared by WSC during project execution. Site visits by IDB staff.	Local counterpart funds are available. Construction contracts are carried out as planned.
1.4 Develop 2 new wellfields with 336 wells (Forest and George Town) to serve jointly 7 communities in the Island of Exuma, from the settlement of Steventon in the North to Rolle Town in the south, including standby power, two storage tanks with a total of 246,000 gallon capacity, two pneumatic tanks, chlorination facilities, small operation and maintenance equipment and 4,920 ft of transmission lines	US\$2,685 spent on direct costs and US\$990,000 spent on land acquisition.		

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
ACTIVITIES			
<p>2.1 Government and WSC adopt measures to increase revenues, reduce staffing costs and improve commercial operation during year 1999.</p>	<p>Tariffs approved for 1999 in New Providence and Family Islands for Water and sewerage services.</p> <p>Total staffing for WSC and its assignment to New Providence water operations, sewerage operations and Family Islands operations at the beginning of the year 1999.</p> <p>Billing frequency in months for every type of customers in New Providence and Family Islands at the beginning of year 1999.</p> <p>Accounts receivable for New Providence water services, sewerage services and Family Island services at the beginning of year 1999.</p>	<p>Statement by the Minister of Public works indicating tariffs approved for year 1999.</p> <p>Detailed financial projections for WSC prepared by its financial department based on latest audited reports.</p> <p>Project team reviews projections prepared by WSC prior to first disbursement.</p>	<p>Other than these changes WSC continues to operate at similar or better levels of efficiency.</p> <p>WSC customers accept and start paying tariffs as approved.</p> <p>Water quality increases in New Providence lure back customers as expected in the projections.</p> <p>Water quality increases in Family Islands generate consumption increases at similar or higher levels than expected in financial projections.</p> <p>Price elasticity assumed for financial projections closely captures customers reaction to proposed tariff increases.</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
ACTIVITIES			
<p>2.2 Government and WSC adopt measures to increase revenues, reduce staffing costs and improve commercial operation during year 2000.</p>	<p>Tariffs approved for 2000 in New Providence and Family Islands for Water and sewerage services.</p> <p>Total staffing for WSC and its assignment to New Providence water operations, sewerage operations and Family Islands operations at the beginning of the year 2000.</p> <p>Billing frequency in months for every type of customers in New providence and Family Islands at the beginning of year 2000.</p> <p>Accounts receivable for New Providence water services, sewerage services and Family Islands services at the beginning of year 2000.</p>	<p>Statement by the Minister of Public works indicating tariffs approved for year 2000.</p> <p>Detailed financial projections for WSC prepared by its financial department based on latest audited reports.</p> <p>Audited financial statements for years 1997 and 1998.</p> <p>Project team reviews projections prepared by WSC at the beginning of second semester of 1999.</p>	<p>Other than these changes WSC continues to operate at similar or better levels of efficiency.</p> <p>WSC customers accept and start paying tariffs as approved.</p> <p>Water quality increases in New Providence lure back customers as expected in the projections.</p> <p>Water quality increases in Family Islands generate consumption increases at similar or higher levels than expected in financial projections.</p> <p>Price elasticity assumed for financial projections closely captures customers reaction to proposed tariff increases.</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
ACTIVITIES			
<p>2.3 Government and WSC adopt measures to increase revenues, reduce staffing costs and improve commercial operation during year 2002.</p>	<p>Tariffs approved for 2002 in New Providence and Family Islands for Water and sewerage services.</p> <p>Total staffing for WSC and its assignment to New Providence water operations, sewerage operations and Family Islands operations at the beginning of the year 2002.</p> <p>Billing frequency in months for every type of customers in New providence and Family Islands at the beginning of year 2002.</p> <p>Accounts receivable for New Providence water services, sewerage services and Family Island services at the beginning of year 2002.</p>	<p>Statement by the Minister of Public works indicating tariffs approved for year 2002.</p> <p>Detailed financial projections for WSC prepared by its financial department based on latest audited reports.</p> <p>Audited financial statements for years 1999 and 2000.</p> <p>Project team reviews projections prepared by WSC in the middle of 2001.</p>	<p>Other than these changes WSC continues to operate at similar or better levels of efficiency.</p> <p>WSC customers accept and start paying tariffs as approved.</p> <p>Water quality increases in New Providence lure back customers as expected in the projections.</p> <p>Water quality increases in Family Islands generate consumption increases at similar or higher levels than expected in financial projections.</p> <p>Price elasticity assumed for financial projections closely captures customers reaction to proposed tariff increases.</p>
<p>3.1 A prefeasibility study to identify a set of feasible alternatives to deal with groundwater pollution problems in New Providence and the family Islands.</p>	<p>US 300,000 spent on the study.</p>	<p>Semiannual reports presented by the executing agency.</p>	<p>A good quality consultant company is hired to carry out the study.</p> <p>Consultants have access to information required to accomplish the task.</p>

PROPOSED RESOLUTION

BAHAMAS. LOAN ____/OC-BH TO THE
WATER AND SEWERAGE CORPORATION
(Family Islands Water Project)

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 the Bank, to enter into such contract or contracts as may be necessary with the Water and Sewerage Corporation, as Borrower, and The Commonwealth of The Bahamas, as Guarantor, for the purpose of granting the former a financing to cooperate in the execution of the Family Islands Water Project. Such financing will be for the amount of up to US\$14,000,000 from the Single Currency Facility of the Ordinary Capital resources of the Bank, and will be subject to the "Terms and Financial Conditions" and "Special Contractual Conditions" of the Executive Summary of the Loan Proposal.