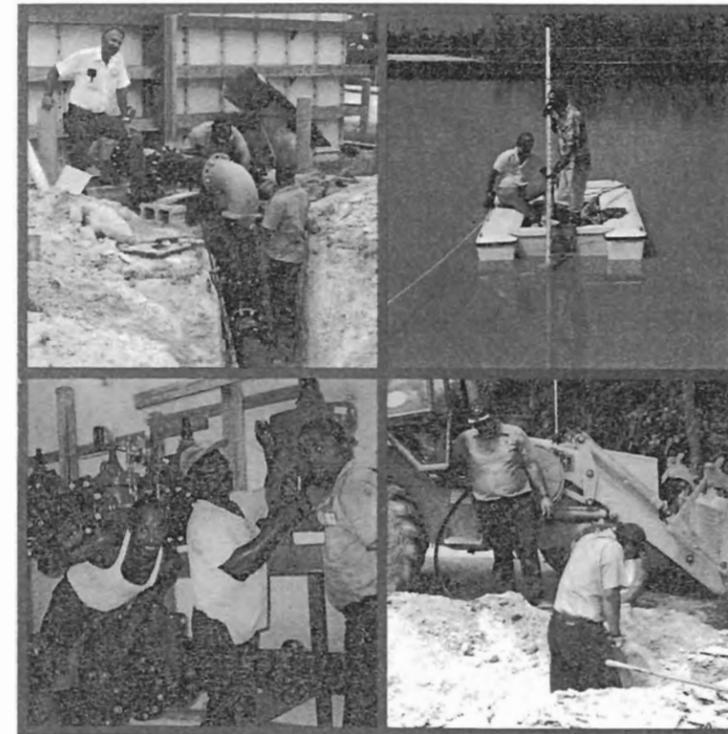


# THE WATER AUTHORITY

## ANNUAL REPORT

### 1994



*The Ministry of Community Development, Sports,  
Women's and Youth Affairs, and Culture*

**THE WATER AUTHORITY  
OF THE CAYMAN ISLANDS**

**ANNUAL REPORT  
1994**

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## Chairman's Report

### The Year 1994

1994 brought many significant changes to the Water Authority, both in staffing and in its direction. I am pleased to report that the Authority weathered these changes well and is in fact a stronger and more cohesive organization than it was at the end of 1993. The Authority continued to operate from a position of increasing financial strength and was able to show a modest profit in 1994. Revenue derived from water sales was slightly more than expected for the year which allowed the Authority to make a reasonable contribution to Government's general revenue.

The Authority recognizes that in this day and age of ever-increasing costs it is of paramount importance to constantly assess operations in order to identify areas of expenditure in which savings can be found. Two of the largest expenses for the Authority are water purchases and debt interest. At the year's end the Authority was in the advanced stages of negotiations to re-finance one of its early project loans with a local bank in order to reduce currency exchange losses, and to secure more favourable financing terms. In addition a new agreement which was signed in April with the Authority's largest water supplier, Ocean Conversion Ltd., will insure a more stable cost for water over the long term.

The former Director, Mr. Richard Beswick, resigned from the Authority in May and was succeeded by the former Deputy Director, Mr. Frederick McTaggart. Several staffing changes occurred at the upper management level of the Authority in order to adjust to this major shifting of responsibilities. Fortunately the resources were available within the Authority to accommodate these changes and no additional outside staffing was taken on. I am pleased to confirm that the Authority now has a Caymanian Acting Director and Deputy Director, and that three other Caymanians were promoted to positions of greater responsibility.

The Bodden Town Water Supply Extension was completed in May at a cost which was almost 7.5% (\$630,000) under budget. Petroservicios Ltda., who was the contractor for this project and also for the rest of the Authority's water distribution system, must be congratulated for a job well done, having been on the island for almost seven years. With the departure of Petroservicios it was necessary for the Authority to increase its own resources to keep up with the growing demand for piped water in all parts of the country. In August the Authority took delivery of a Vermeer V-8050 trenching machine for use on water service installations, and a second service connection crew was hired on in September. At the end of the year plans were well underway to purchase a larger tracked trenching machine in order to carry out large diameter water main extensions and new projects.

The Cayman Brac public water system continued to operate efficiently in 1994 and received a sales boost when Government chose to strictly enforce the Water (Production and Supply) Law after a hotel in Cayman Brac attempted to import and operate a new water production plant without the required concession from Government. The dispute was resolved amicably and the hotel continues to use the public water system as its exclusive source of water.

Negotiations with Ocean Conversion (Cayman) Ltd. were completed in April and a new licence was signed with Government which required them to increase their water production capacity at the Red Gate plant to 4,000 m<sup>3</sup> per day by December. It also allowed them to replace their electric-driven high pressure pumps with more efficient diesel-driven positive displacement pumps. At the end of the year the plant capacity had been increased in accordance with the new licence and efforts were well underway to commission the new diesel-driven pumps early in 1995. Central DeSal Ltd. however continued to experience problems with their plant and it was unclear at the end of the year whether the plant would ever function as required in their licence which was signed in August 1993.

The public sewage collection and treatment system which serves the West Bay Beach area continued to operate smoothly, but also continued to require more maintenance expenditure than other Authority operations. Two rehabilitation projects are scheduled for 1995. One project involves the insitu rehabilitation of 38 concrete manholes using the same method which was used to rehabilitate 9 pumping stations and 35 manholes back in 1991 and 1992. The other project consists of lining approximately 460 metres of damaged gravity sewer pipe using the same insitu repair process which was utilized in 1992 and 1993 to repair the major portion of the Authority's 150mm diameter clay gravity sewer. It is expected that these types of projects will continue to be necessary in the future as the sewage collection system grows older.

Staff training and development continued to be a high priority and the Deputy Director's post was redefined to include this area of responsibility. Several courses were sponsored for staff at the community college during the year. The Authority and Government continued to support the education of three Caymanian engineering students who will return to work with the Authority in 1995 and 1996.

The Authority has accomplished much over the past 11 years. Yet there is still much work ahead, not only to keep up with growth within existing service areas, but to properly plan for the future so that everyone in this blessed country has access to a safe and wholesome water supply. And to insure that this country's natural beauty is maintained by providing proper wastewater treatment and disposal. Proper monitoring of groundwater resources will ensure that this precious resource is available for future generations.

I would once again like to express my deepest gratitude to my fellow Board members and to the staff of the Water Authority for their dedication and continued commitment to the mission of the Authority. Although some times were indeed difficult during the year, I am pleased that the Authority as a whole has remained focused on the future and its unlimited potential.



Hon. McKeeva Bush MLA JP  
Chairman

## GENERAL INFORMATION

The Water Authority of the Cayman Islands is a statutory body which was incorporated through the Water Authority Law, 1982 (Law 18 of 1982). The primary mission of the Water Authority is to provide public water and sewerage to the Cayman Islands, and to protect and manage all water resources of the country.

Over the past twelve years the Water Authority has carried out a number of projects to map and monitor the groundwater resources of the country. The Authority has constructed the country's first public sewerage system in the West Bay Beach resort area, and has constructed public water supply systems in both Grand Cayman and Cayman Brac.

The Water Authority is managed by a Board and a Chief Executive Officer (Director). Board members are appointed by the Governor for a period not exceeding two years, while the Director is appointed as a permanent employee. Board meetings are generally held every two months and 10 meetings were held during 1994.

### 1994 Water Authority Board Members

Chairman:	Hon McKeeva Bush MLA JP
Members:	Permanent Secretary, CD,S,YA&C Mr. Leonard Dilbert
	Director of DOE Mr. Walling Whittaker
	Deputy Financial Secretary Mr. A. Joel Walton
	Mr. Harry Chisholm JP Mr. Richard Flowers Mr. Philip Hydes Mr. Brainard Watler Mr. Otto Watler
Secretary:	Director of Water Authority Mr. Richard Beswick and Mr. Frederick McTaggart

The end of May marked the completion of the Bodden Town Water Supply Extension and with that ended a public water supply project which has spanned seven years. When this project commenced in 1987 most residents of the country relied on rain water catchments and wells for drinking water, and it certainly was not envisaged that demand for piped water would have exploded as it has. The Authority now provides wholesome piped water to all of George Town, Savannah, Bodden Town and all areas in between. Throughout the entire project the Authority utilized the same civil engineering contractor (Petroservicios Ltda.) and the same material supplier (Propax Industrial Exports Ltd.), which in itself speaks very highly of the service which was given by each of these firms.

Growth of the public water supply system continued at the phenomenal rate of 22% during 1994, with the number of connections increasing from 3,824 at the end of 1993 to 4,658 by December 1994. This translated into an increase in 1994 average daily water sales of 19.5% over 1993 figures. The Authority purchased a Vermeer V-8050 rubber-tyred trenching machine with a 6 1/2" cut rock wheel and hired on a second service connection crew in order to keep up with the large number of water supply connections during the year.

With the departure of Petroservicios and their heavy equipment it was necessary for the Authority to re-consider current and future needs for water supply extensions and projects. It was recognized that several developed areas of the country were still in dire need of a reliable water supply, and that the Authority must be in a position to provide infrastructure to these areas. In addition, new developments within existing service areas were being reviewed every month and it was necessary to insure that infrastructure would be included at

the developer's cost. Throughout the Authority's short history, contractors have been used for all large-scale civil engineering projects. However it was determined that it would be more economical and practical for the Authority to operate its own heavy equipment and construction crew, and to continue a much slower programme to construct extensions to the water and sewerage system using these in-house resources. By the end of the year efforts were well underway to purchase additional trenching equipment and to set up a full-time construction crew to work on water and sewerage extensions.

Central DeSal Ltd. continued to experience problems with their IDE/Ahlstrom water production plant during 1994 and were unable to meet their contractual requirements during much of the year. The Authority was forced to purchase water from Cayman Water Company during January, February, April and June in order to make up for shortfalls of the Central DeSal plant. The Authority is grateful for the assistance provided by Cayman Water Company during these periods.

Ocean Conversion Ltd., the Authority's primary water supplier, continued to operate at peak efficiency and by year's end had provided over 80% of the Authority's total water purchases for the year. In November their Red Gate plant was upgraded from a production rate of 3,000 m<sup>3</sup> to 4,000 m<sup>3</sup> per day. Construction had commenced on a building to house new diesel-driven positive displacement pumps and it was expected that this extension would be complete in early 1995. Modifications to their energy recovery system were completed during the year and allow the plant to operate much more reliably and with less vibration.

The West Bay Beach Sewerage System continued to require a great deal of attention and maintenance. A closed circuit TV (CCTV) inspection was carried out by Water Authority personnel of all previously lined sections of sewer in order to assess the performance of the liner. This was required when a lined section failed near Pizza Hut after about 1 1/2 years of service. No other lined sections were found to require remedial work and the contractor which had originally installed the liner in early 1993 agreed to repair the section at no cost to the Authority, despite the fact that the section was outside the warranty period. The CCTV survey also included a number of un-lined 100mm and 150mm diameter clay sewers which were thought to require remedial work. In December a contract was signed with Madsen-Barr Corporation of the USA to repair approximately 460 metres of previously un-lined clay sewer which had cracked and was allowing groundwater to enter the sewerage system. This work was scheduled to commence in early 1995.

Tender documents were prepared for the structural lining of 38 manholes which were identified in 1993 as needing remedial work due to deterioration of concrete. It is expected that this work will be carried out in 1995.

#### Finance

1994 was the fifth year of statutory independence for the Water Authority. The Authority's financial statements and explanatory notes are located at the end of this report.

The Authority continued to strengthen its financial position in 1994 with a 14% increase in operating revenue during the year. This was accomplished through increased water revenue resulting from expansion of the distribution area into Bodden Town and Pease Bay.

Another significant achievement during the year was an 85% increase in the net profit ratio based on net surplus before extraordinary items, despite the significant foreign exchange losses due to the long term loan repayment to Caribbean Development Bank. The increase was mainly due to an improvement in the operating surplus which increased by 67% during the year.

The gross profit ratio also increased during the year from 15% in 1993 to 25% in 1994. This was mainly the result of a decrease in repairs and maintenance, electricity, and the unit cost for water purchased from the Authority's primary supplier, Ocean Conversion Ltd.

Administrative expenses increased by 33% in 1994 compared to 18% in 1993. This increase was mainly due to an increase in salaries, staff training and benefits, bad debts, and insurance expenses.

The Authority's return on capital employed was 3.64% for 1994 (1993: 3.99%). This marginal decline was due to the capitalization of the cost of the Bodden Town water supply project in June 1994, however, the effects will be reflected in future revenue, therefore the long term forecast is for an increasing return on capital employed.

The liquidity position of the Authority is consistent with the prior year even though there was a marginal decline in cash and cash equivalents at the end of the year.

#### Staffing

The Authority experienced several high level staffing changes during 1994, including changes to the posts of Director, Deputy Director, and management positions in operations. The Authority's staff structure at 31 December 1994 is as follows:-

Water Authority Staff Complement	
Acting Director	F W McTaggart BSc
Acting Deputy Director	G L Frederick-van Genderen BSc
Accountant	R Daije BA
New Works Engineer	TCvan Zanten MSc Eur Eng MIWEM
Operations Engineer	C McCoy BSc
Water Resources Engineer	H-J van Genderen MSc Eur Eng
Operations Manager	T Hill Master Plumber
Assistant Accountant	J Nicholas
Administrative Assistant	A McCoy
Cashier	V Powery
Customer Service Supervisor	N Chisholm
Customer Service Assistant	B Webb
Meter Reader	C Morgan
Meter Reader	A Archibold
Meter Reader	I McLaughlin
Meter Reader	D Powery
Meter Reader	M Smith
Receptionist	Z Bush
Senior Laboratory Technologist	B MacAree BSc
Laboratory Technician	C Barnes
Senior Draughtsperson	C Seymour AAs
Draughtsman	G Welcome
Water Resources Superintendent	V Rankine
Superintendent-Cayman Brac	B Banks
Executive Officer-Cayman Brac	K Lazzari
Superintendent	E Connolly
Trainee Engineer	B Whittaker AAs
Engineering Technician	D Manderson
Water Supply Foreman	Jack Hunter
Foreman	V Whittaker
Operator	L Tivy
Operator	B Martinez
Operator	S Campbell
Operator-Heavy Equipment	W Watler
Operator-Heavy Equipment	B Watler
Assistant Operator	C Ramoon
Assistant Operator	D Myles
Labourer	J Williams
Labourer	V Grant

The following movements and changes in personnel occurred during the year:-

Mr Frederick W McTaggart was promoted from Deputy Director to Acting Director when the Director Mr R G B Beswick resigned.

Mrs Gelia L Frederick-van Genderen was promoted from Operations Scientist to Acting Deputy Director.

Mr Carl McCoy moved from the post of Resident Engineer to Operations Engineer.

Mr Thomas Hill was promoted from Senior Superintendent to Operations Manager.

Mr Hendrik-Jan van Genderen moved from the post of Special Projects Engineer to Water Resources Engineer.

Mrs Brenda MacAree was promoted from Laboratory Technician to Senior Laboratory Technologist.

Mr David Powery moved from the post of Water Resources Technician to Meter Reader.

Ms Barbara Webb moved from the post of Clerical Officer to Customer Service Assistant.

Ms Cheryl Barnes joined the Authority as a Laboratory Technician.

Ms Vielka Powery joined the Authority as a Cashier.

Ms Zulema Bush joined the Authority as a Receptionist.

Mr Jack Hunter joined the Authority as a Water Supply Foreman.

Mr Harwood Jackson joined the Authority as a Water Supply Foreman in September and resigned in December.

Mr Bruce Watler joined the Authority as an Operator-Heavy Equipment.

Mr Mervin Smith joined the Authority as a Meter Reader.

Mr Richard G B Beswick, Director, left the Authority and was replaced by Mr Frederick McTaggart.

Dr Sam Ng, Hydrogeologist, left the Authority. The post was renamed to Water Resources Engineer which was filled by Mr Hendrik-Jan van Genderen.

Mr Robert Thompson, Clerk of Works, left at the end of his contract and the completion of the Bodden Town Water Supply Project.

Mr Kevin Goring, temporary Technician, left the Authority to pursue other interests.

Mr. Norman McField resigned his post as Meter Reader.

At the end of the year the total staff complement stood at 39 of which 82% are Caymanian.

#### Awards

N Chisholm, the Customer Service Supervisor, was awarded the prestigious Chairman's Award for 1993. N Chisholm joined the Authority in June 1992 and has worked in his present position from that time. The award was presented to him by the Hon Mr McKeeva Bush, Chairman of the Water Authority during a function held in Mr. Chisholm's honour.

#### Training

The Authority recognises that training of local staff is an important part of the development of its human resources. Participation in local and regional seminars, workshops and conferences is strongly supported. Full time education overseas is also encouraged.

The Authority continued its participation in the Caribbean Basin Water Management Programme (CBWMP), a training programme for water utilities in the Caribbean region. In 1994, the CBWMP Board of Directors employed a Regional Training Coordinator (RTC) to carry out the training objectives of the organisation. Institutional support for the programme continues to be provided by the Caribbean Environmental Health Institute (CEHI), St Lucia.

The Authority participated in one of the CBWMP sponsored workshops held in 1994: G Frederick-van Genderen attended a Caribbean Workshop on World Health Organisation (WHO) Guidelines for Drinking-Water Quality held in Trinidad.

Additionally the CBWMP sponsored B Whittaker to attend the Caribbean Water and Wastewater Association Conference in Jamaica.

The Community College of the Cayman Islands (CCCI) customized a 12 week course in Basic Electrical Principles for 15 of the Authority's staff, mainly from the Operations department.

Three of the Authority's engineers and the Drawing Office staff attended a 1 week workshop on AutoCAD Release 12 for Windows: Basic Skills and Drawing Production facilitated by The MicroCAD Institute.

F McTaggart attended a 4-day workshop on AutoCAD User Application Development Training facilitated by The MicroCAD Institute.

Five of the Authority's employees attended and completed the Introduction to Computers course (10 weeks) offered at the CCCI.

Five of the Authority's staff commenced the Beginners' Typewriting course at the CCCI. This course is for 18 weeks and they expect to complete it in early 1995.

R Daije and T van Zanten attended a 2 day seminar on Environmental Impact Assessment sponsored by the Caribbean Development Bank (CDB) and Agricultural Investment and Development Board (AIDB).

A McCoy attended a Customer Service Workshop (Front-line Staff) facilitated by the CI Government's Personnel Training Unit (PTU).

J Nicholas attended a Customer Service Workshop (Supervisors) facilitated by the CI Government's Personnel Training Unit (PTU).

K Lazzari successfully completed Level 2 of the Pitmans Book-keeping and Accounts course in Cayman Brac.

R Daije, J Nicholas, and A McCoy attended a 3 hour workshop in Introduction to Great Plains Dynamics (Accounting software).

All staff members were trained in the new Performance Appraisal technique being instituted by the CI Government.

The Authority purchased training videos in Basic Windows, Word and Excel, and Advanced Windows, Word and Excel which were made available to all staff members.

All members of staff attended a 2 hour seminar on Fresh Groundwater Development in Grand Cayman which was presented by S Ng.

S Ng presented 2 lectures on groundwater at a Soil and Water Management Workshop for local farmers and plant nursery owners sponsored by the Agriculture Department and the regionally-based Continuing Education Programme in Agricultural Technology (CEPAT).

In 1994 the Authority became a full participating member of the Employee Assistance Programme (EAP) of the Cayman Islands. All staff members will receive training in early 1995 on how the EAP works and how they may benefit from the programme.

Other training received by the Water Authority staff was as follows:

T Whittaker completed a MSc in Environmental Engineering at Stevens Institute of Technology, New Jersey in December 1994. He was fully sponsored by the Water Authority.

C Reid entered his third year at Florida Institute of Technology (FIT) studying for a BSc in Civil Engineering. He is sponsored by the Cayman Islands Government.

A Reid began his final year at Florida Institute of Technology (FIT) where he is studying for a BSc in Civil Engineering. He is sponsored by the Cayman Islands Government.

**WATER RESOURCES**

**Groundwater Monitoring**

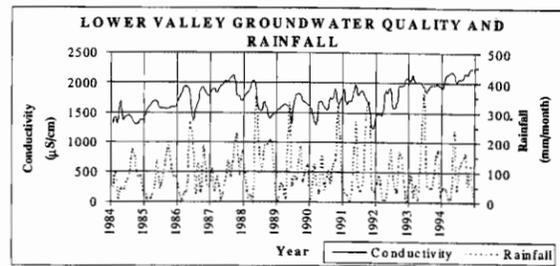
The comprehensive hydrogeological monitoring programme in Lower Valley and East End, where the Water Authority's wellfields are in operation, continued throughout 1994. The monitoring network consists of observation wells, piezometers, water level recorders and an island-wide network of rain gauges. The salinity of each production well and the volume of water pumped from each well is measured at regular intervals.

The water pumped from wells for irrigation by four farms located over the East End lens is metered. Monthly consumption by the farmers is closely monitored, as well as the salinity of the water abstracted from the ground.

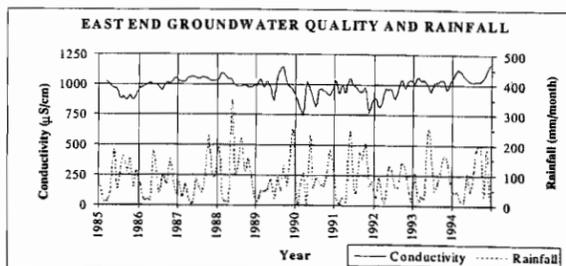
The East End lens has an estimated safe yield of 3,000 m<sup>3</sup>/day (800,000 US gallons/day), the total abstraction recorded from the farm wells

and the Water Authority wellfield was 120 m<sup>3</sup>/day (32,000 US gallons/day) in 1994.

The salinity of the groundwater pumped from the Lower Valley and East End wellfield increased slightly during the year. The groundwater quality generally correlates with the rainfall, as the amount of rain is the principle factor determining recharge of the lenses. Years with a significant higher rainfall than average lead to a noticeable lower salinity of the groundwater, whereas lower rainfall leads to a higher salinity. This effect also takes place during the wet season; the heavy rains at the start of wet season cause a decrease of the salinity of the water from both wellfields, and the salinity increases towards the end of the dry season.

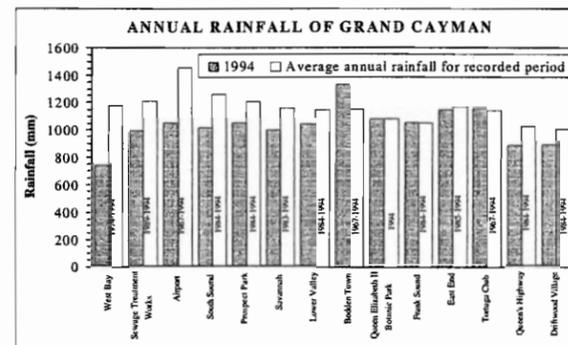


Rainfall in 1994 was below average, causing an increase in salinity of both wellfields towards the end of the year. This effect was especially noticeable in Lower Valley. This lens is much smaller and thinner than the East End lens and therefore the effect of rainfall on groundwater quality is more apparent. Other controlling factors of water quality fluctuation are tidal oscillation and the total volume abstracted from the lenses.



**Rainfall Distribution**

Data for rainfall are collected from the island-wide network of primary rain gauges; a number of dedicated volunteers keep daily records for the Water Authority. Data collected by the Mosquito Research Control Unit and Civil Aviation Authority are included in the graph showing the rainfall. 1994 was a dry year; the island wide average of 14 stations was 1021 mm (40 inches) compared to 1236 mm (49 inches) in 1993. The island-wide average for the 14 stations for the period that data are available is 1148 mm (45 inches). Rainfall distribution on Grand Cayman is generally dictated by the prevailing easterly wind; therefore, the eastern part of the island is relatively dry. 1994 showed a somewhat different pattern, the western part of Grand Cayman received a significantly lower amount of rainfall than normal, whereas rainfall in the eastern districts was close to average.



**Water Resource Licencing**

The Water Authority continued to monitor works that impact groundwater resources. The following number of licences and permits were issued in 1994 in compliance with the Authority's statutory obligations:

- Discharge Permits 282
- Abstraction Licence 0
- Quarry Permit 1
- Canal Work Permit 0
- Well Driller's Licence 5
- Cesspool Emptiers Licence 3

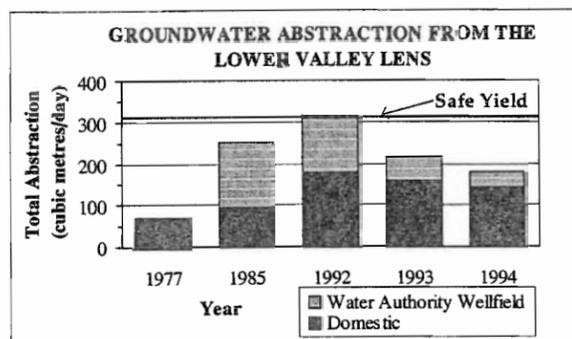
The Planning Department collects the revenue for discharge permits when the application for Plumbing Approval is made. The Water Authority issues the permits; and is reimbursed by the Planning Department.

**Cayman Brac Well Development**

The District Commissioner requested assistance from the Water Authority and the Department of Agriculture to remedy the water shortage problems of cattle farmers in Cayman Brac. A proposal was worked out to install two solar pumps and two 3.8 m<sup>3</sup> (1,000 US gallon) storage reservoirs on the Bluff on two of the wells which were drilled in 1986 as part of the Authority's groundwater investigation programme. These wells are located over the only fresh water lens of exploitable significance, underneath the Bluff, south of Tibbetts Turn. One of these wells is presently equipped with a handpump. It is expected that the installation of the solar pumps will be completed in 1995.

**Lower Valley Wellfield Closure**

A survey was carried out to establish the total abstraction of fresh groundwater from the Lower Valley lens. Residential development in this area has increased significantly over the years, and therefore the abstraction of fresh groundwater for domestic purposes increased as well. Aerial photographs were used to determine the number of houses in 1977, 1985 and 1992. Based on the number of households, the groundwater abstraction for domestic purposes was estimated. The total abstraction comprises domestic abstraction and the volume pumped from the Water Authority's wellfield. The figure below shows the annual total abstraction for 1977, 1985, and the last three years. It is estimated that the total volume abstracted in 1992 exceeded the safe yield of the lens slightly.



It is assumed that the domestic abstraction decreased after the piped water supply system in the Lower Valley area was completed in 1993. Approximately 54% of all households in Lower Valley were connected to the system by December 1994.

The Water Authority decided to close the Lower Valley wellfield by the end of 1994 as a measure to protect the integrity of the lens. Monitoring of the lens will continue in the 1995.

#### **Pond Study**

Many natural ponds in the Cayman Islands produce offensive odours during the dry season when water levels are low. This has led to complaints from residents living close to these ponds. The Water Authority in collaboration with the Department of the Environment (DOE) prepared a preliminary plan to study the causes of the odour problems. The Water Authority will monitor the hydrogeological conditions whereas the DOE will study the ecology and biology of the pond. Preparations were made to investigate the Salt Water Pond in Cayman Brac. This study will be continued in 1995.

#### **Botanical Park**

The Water Authority advised the Queen Elizabeth II Botanical Park on the development of its fresh water resources. A hydrogeological survey was carried out in the park area and 3 shallow wells were drilled to

obtain further information on the groundwater. Based on the results of this study it was decided that a trenchwell would be the best method to develop the small fresh groundwater lens found at the Park.

The trenchwell was completed in March 1994 and two 19 m<sup>3</sup> (5,000 US gallon) water storage tanks were erected with assistance of the Water Authority. Water is used in the plant propagation area of the park and is pumped from the lens at a maximum flow rate of 7.5 litre per minute (2 US gallons per minute) to limit the drawdown of the fresh water to an absolute minimum. The salinity of the water increased continuously over the first four months, especially after heavy rains. This was caused by salt water leaching from the salty fill material used in the area where the trenchwell was located. After this material was replaced the water quality improved significantly and remained below a total dissolved solids of 1,000 mg/l, the maximum acceptable limit for water used in the plant propagation area. The condition of groundwater resources at the park is monitored by a water level recorder, a rain gauge and daily recordings of the salinity of a number of naturally occurring water resources in the park.

#### **Little Cayman Hydrogeological Study**

The Water Authority conducted a preliminary hydrogeological survey in Little Cayman in 1994. No groundwater study had been carried out before on the island. An inventory of all accessible drilled and dug wells, natural wells and ponds was carried out with special emphasis on their water quality. Four areas were identified to have a potential for fresh groundwater resources, however, because of inaccessibility no further investigation of these areas was undertaken. The small size of the island, low relief, narrow width and presence of brackish water swamps suggests that fresh groundwater resources, if present, are of

limited extent. In order to obtain more reliable data on rainfall in Little Cayman, two rain gauges were installed, one is located on the west side of the island and the other on the east side.

### **QUALITY CONTROL AND RELATED MATTERS**

#### **Laboratory**

The laboratory staff responsibilities were reorganised in 1994. The post of operations scientist was deleted and a senior laboratory technologist appointed. In addition, a young Caymanian was employed and trained as a laboratory technician.

In 1994 the laboratory acquired a new Fisher Accumet Selective Ion Analyser, an Orion Digital Portable pH meter, and replaced several electrical conductivity and total dissolved solids meters.

The major activities of the Laboratory continue to be:

- Quality control of the public water supplies (Grand Cayman and Cayman Brac), Lower Valley and East End reservoirs;
- Monitoring of the Lower Valley and East End groundwater resources;
- Research and monitoring of the West Bay Beach sewerage system and sewage treatment works;
- Providing the public with laboratory services for water analyses;
- Coastal water monitoring in the Hog Sty Bay area;
- Development and implementation of training programmes for Authority personnel.

#### **Monitoring Programmes**

As a major part of its function, the laboratory continues to carry out comprehensive

monitoring programmes on the Authority's operations. The Authority's operations include the piped water supplies (George Town to Midland Acres; Cayman Brac), East End and Lower Valley wellfields, West Bay Beach sewerage and sewage treatment works, and queries.

The Authority's operations accounted for 85% of the samples analysed in 1994. Samples were analysed for various Government departments accounting for 10% of samples analysed. The remaining 5% of samples were private requests. The total number of samples analysed in 1994 were 2081.

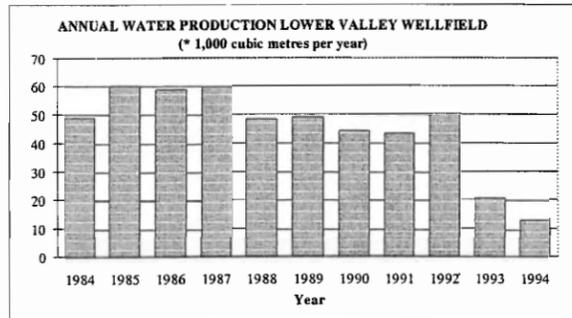
#### **Public Water Supply-Grand Cayman**

Monitoring of the distribution system continued with regular testing of chlorine residuals, total and faecal coliform bacteria, electrical conductivity (EC), pH, and total dissolved solids (TDS) at specific sampling points. Four additional sample taps were added to the monitoring programme. The TDS and pH of water entering the reservoirs are measured twice daily. Water that enters the distribution system is analysed twice daily for TDS, pH and chlorine residuals. Bacteriological analyses are carried out daily during the working week (Mon-Fri).

The free chlorine residual of water entering the public water supply system averaged 0.14 mg/l, while the pH averaged 7.49 units and the TDS averaged 258 mg/l. As zinc orthophosphate is used to inhibit corrosion, the zinc content is measured routinely. The zinc concentration in the distribution system averaged 0.46 mg/l. Daily analyses for both total and faecal coliform bacteria in the distribution system showed negative throughout the year.

The laboratory attended to a number of queries from customers. Queries investigated by

piped water supply system was completed in George Town and Bodden Town.



The production from the wellfield decreased further from 4.4 m<sup>3</sup>/hr (1160 US gallon/hr) in 1993 to 3.3 m<sup>3</sup>/hr (870 US gallon/hr) in 1994. The total volume pumped from the wellfield in 1994 was 13,500 m<sup>3</sup> (36,640,000 US gallon) compared to 21,000 m<sup>3</sup> (55,440,000 US gallon) in 1993. The decreased production still met the demand. The total volume water pumped from the wellfield in its entire lifetime is 500,000 m<sup>3</sup> (132,000,000 US gallons), at an average of 124 m<sup>3</sup>/day (33,000 US gallons).

**East End Wellfield**

The East End wellfield completed its ninth full year of production (1986-1994). Demand for East End groundwater increased slightly in 1994. The wellfield operated at about 7% of its capacity. The loss from the pipeline was 3.8% and loss from the reservoir is 6.2% resulting in a total loss of 9.4% in 1994. The total quantity of water produced since commencement of the wellfield in March 1985 was 232,000 m<sup>3</sup> (61,250,000 US gallons). Water from the public tap at the reservoir is available free of cost.

Year	Hours run	Average Pumping Rate (m <sup>3</sup> /hr)	Quantity Produced (m <sup>3</sup> )	Percentage Loss	Power Consumption (KWh/m <sup>3</sup> )	Quantity Sold (m <sup>3</sup> )
1986	603	14.7	8,877	1.03	0.46	4,191
1987	2,712	14.0	37,973	1.37	0.47	29,263
1988	3,134	14.0	43,879	1.36	0.45	33,815
1989	3,440	16.5	56,928	1.05	0.40	57,973
1990	1,310	14.8	19,408	1.00	0.43	19,704
1991	1,816	15.1	27,438	4.55	0.45	26,323
1992	1,182	13.2	15,546	13.90	0.44	11,653
1993	540	16.5	8,916	14.33	0.43	6,489
1994	623	16.0	9,945	9.38	0.43	9,013

**Cayman Water Company**

Cayman Water Company's water sales grew by a modest 3% during the year. They continued expansion of their water distribution system into the district of West Bay - sales for this area increased to 41.8 million US gallons, up from 7.1 million US gallons in 1993. The company has also commenced construction on a new water production facility located in the district, which is due to be commissioned early next year. A dispute between the Cayman Water Company and Government regarding the annual CPI adjustment to water rates arose late in the year. The matter was settled in Grand Court in late December in favour of the Company.

	1994	1993	1992	Var. 94-93	Var. 93-92
Water Produced (US Galls)	299,326,200	291,886,200	201,343,337	3%	45%
Water Purchased from WAC and Hyatt	13,675,824	7,194,800	895,116	90%	704%
Total Water Sold	280,183,423	278,568,400	172,487,101	1%	62%
Pipeline Sales (US Galls)	275,070,532	220,122,100	166,667,081	25%	32%
Truckers Sales (US Galls)	2,225,700	2,657,100	5,820,020	-16%	-54%
WBSA Sales (US Galls)	41,890,550	7,494,860	947,420	459%	N/A
Other Sales (Safe Haven: non-potable)	47,035,600	55,789,200	0	-16%	N/A
Average Fuel Adj. Factor	\$0.75	\$0.78	\$0.68	-4%	13%
Total Royalty Payment (CIS)	\$282,214	\$275,350	\$222,461	2%	24%
Unaccounted for Water	10.32%	7.34%	14.36%	41%	-49%

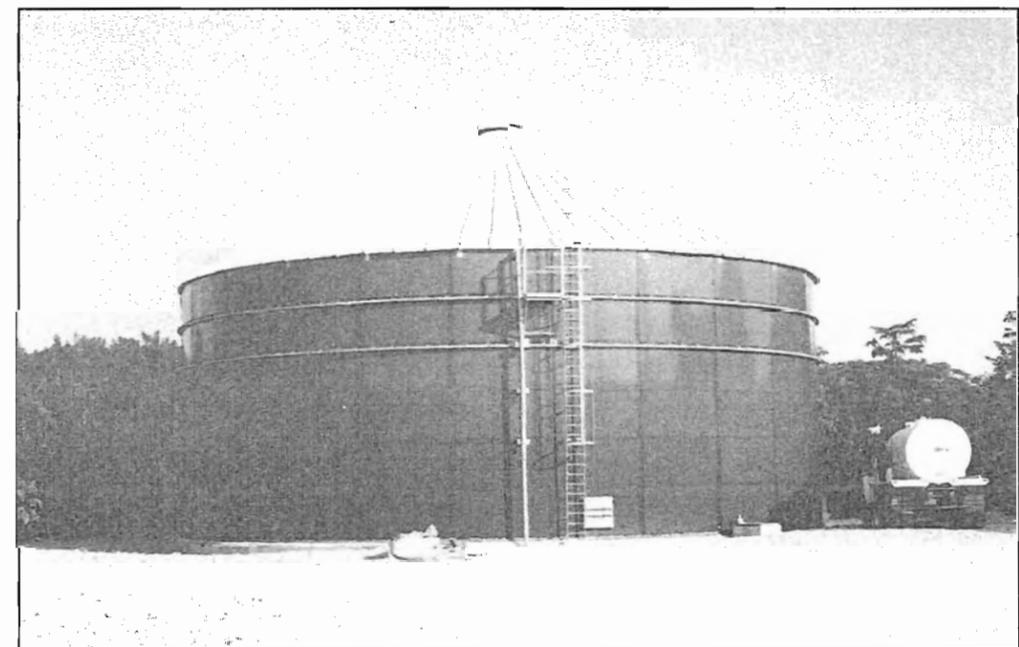
**George Town/Bodden Town Water Supply**

In 1994, Petroservicios Ltda. successfully completed the Bodden Town Water Supply Project, terminating the pipeline extension at Midland Acres Sub-Division just east of Bodden Town. This Project also included the construction of a 3000 cubic meter capacity storage reservoir at the Red Gate Water Works. The reservoir was constructed to provide adequate storage capacity for the greatly expanded water distribution system.

The number of new customers connecting to the system increased by 22% from 3,824 in December, 1993 to 4,658 in December, 1994. This averages to about 70 connections per month. A new Vermeer V-8050 rubber-tyred trencher was acquired in August this year in order to more effectively handle the increased demand for customer connections. Also, this gave the Operations Department the added



The Authority takes delivery of the new Vermeer V-8050 trenching machine which is used for water service connections and small pipeline installations.



2,500 m<sup>3</sup> water reservoir and tanker truck at the Cayman Brac Water Supply compound. The truck is operated by the Authority to provide water to residents not currently served by the piped water system.

There was no significant increase in sludge depth in the facultative ponds, 1.1 and 1.2. In the maturation ponds 2.1 and 2.2 there was a significant decrease in the average sludge depth measured in 1994. This may be attributed to the natural digestion and aging processes that occur in waste stabilisation pond bottom sediments.

Sludge depth will continue to be monitored as part of the operational performance evaluation of the sewage treatment works.

Average Sludge Depth in Waste Stabilisation Ponds

Year	Pond 1.1 (metres)	Pond 1.2 (metres)	Pond 2.1 (metres)	Pond 2.2 (metres)
1990	0.145	0.164	0.054	0.041
1991	0.346	0.294	0.215	0.241
1992	0.385	0.362	0.177	0.217
1993	0.345	0.371	0.303	0.298
1994	0.343	0.345	0.123	0.126

#### Hog Sty Bay Monitoring Programme

The monitoring programme commenced in February 1991 as a part of a joint study between the Water Authority and the Natural Resources Unit (now the Preservation and Conservation Unit-PCU of the DoE). The programme has continued in order to monitor trends although the results have not identified any significant pollution.

The location of sample points, sampling methods and frequency were the same as those outlined in the Water Authority's Annual Report 1992. All samples were analysed for faecal coliform and enterococci bacteria in addition to physico-chemical parameters.

There has been a significant decrease in the average faecal coliform bacteria densities since 1993. The highest average for faecal coliform was 1.6 cfu/100ml at sampling point 8. The highest individual faecal coliform result obtained in 1994 was 15 cfu/100ml at sampling point 8.

The average enterococci bacteria densities also decreased in 1994. The highest average for enterococci was 0.95 cfu/100ml at sampling point 2. The highest individual enterococci result was 10 cfu/100ml at sampling point 2 (subsurface sample).

The physico-chemical parameters are as expected for tropical marine coastal waters. Both bacteriological parameters, faecal coliforms and enterococci, are within the United States Environmental Protection Agency and the European Union standards for bathing water.

Hog Sty Bay Monitoring Results

Year	Average Faecal coliform bacteria (cfu/100ml)	Average Enterococci bacteria (cfu/100ml)
1991	1.9	3.2
1992	9.8	2.4
1993	19.2	1.4
1994	0.6	0.5

#### Research

G Frederick-van Genderen carried out a major full-scale experiment as part of her fulfillment for a collaborative PhD with the University of Surrey, UK. A research study completed in June 1993 concluded that it would be feasible to carry out full-scale experiments in the waste stabilisation ponds using *Serratia marcescens* bacteriophage.

The major full-scale experiment, completed in September 1994, was successful in assessing the hydraulic performance of the sewage treatment works. Wind-driven short-circuiting was identified in the facultative ponds.

The residence time estimated from the experiment and the short-circuiting identified were confirmed independently using a numerical model developed at the University of Surrey. The close agreement of the experimental study results with those of the numerical model have fundamental

implications for the future of pond design and further research.

The PhD thesis is expected to be submitted and the *viva voce* take place in mid 1995.

#### Conferences, Papers and Reports

##### Conferences

Staff of the Water Authority attended the following conferences:

The Third Annual Conference and Exposition of the Caribbean Water and Wastewater Association (CWWA) held in Kingston, Jamaica, 3-7 October 1994.

The American Water Works Association (AWWA) Annual Conference and Exposition held in Manhattan, New York, 20-23 June 1994.

The Caribbean Electrical Utility Services Corporation (CARILEC) 1994 CEO's Symposium held at the Clarion Hotel, June 1994.

##### Papers

Jones, B. Geology of the Cayman Islands. In: Brunt, M.A. and Davies, J.E. (eds.), The Cayman Islands, Natural History and Biogeography. Kluwer Academic Publishers, Dordrecht, Netherlands, pp13-49.

Ng, K.-C.S. and Beswick, R.G.B. Groundwater in the Cayman Islands. In: Brunt, M.A. and Davies, J.E. (eds.), The Cayman Islands, Natural History and Biogeography. Kluwer Academic Publishers, Dordrecht, Netherlands, pp 61-74.

##### Reports

- Closed-circuit TV (CCTV) inspection report of 100-150mm diameter (lined and

unlined) pipes of the West Bay Beach Sewerage System.

- Feasibility report of groundwater development on the Bluff, Cayman Brac.
- Further development of piped water supply.
- Hog Sty Bay Coastal Monitoring Programme - Preliminary Bacteriological Data Summary.
- Hydrogeological survey of Little Cayman.
- Interim report on the status of East End lens.
- Justification for the closure of the Lower Valley Wellfield.
- Pipeline extensions using in-house resources - a feasibility report.
- Report and recommendations on the acquisition of rock trencher for extension of large diameter water pipeline - Cayman Islands.
- Survey of sewage from marine vessels in Grand Cayman waters (in conjunction with the DoE).

#### WATER SUPPLY-OPERATIONS

##### Lower Valley Wellfield

The Lower Valley wellfield completed its eleventh and last year of production (1984-1994). The development of the wellfield was the first major project undertaken by the Water Authority. It has been a significant source of fresh water in the years before the Authority's

laboratory staff represented <0.1% of all public water supply customers. Written reports were provided to customers, and where necessary, they were advised on the action to take regarding problems encountered on the customer's side of the meter box.

Samples of water from the public water supply system, the feedwaters from the Authority's two water suppliers were analysed overseas for various parameters. Water entering the distribution line was tested for disinfection by-products such as trihalomethanes (THMs) and total organic halogens (TOHs). All results showed that none of these compounds were detectable in the water.

**Public Water Supply-Cayman Brac**

Monitoring of the distribution system continued with regular testing of chlorine residuals, total and faecal coliform bacteria, pH, and TDS at specific sampling points.

The TDS and pH of water entering the reservoir are measured daily. Water that enters the distribution system is analysed daily for TDS, pH and chlorine residuals. Bacteriological analyses are carried weekly. Sample taps within the distribution system are monitored monthly.

In the distribution system, the free chlorine residual of water averaged 0.20 mg/l, pH averaged 7.55 units, TDS averaged 405 mg/l, and zinc averaged 0.55 mg/l.

Samples of water from the public water supply system, the feedwater from the Authority's water supplier in Cayman Brac were analysed overseas for various parameters. Water entering the distribution line was tested for disinfection by-products such as THMs and TOHs. All results showed that none of these compounds were detectable in the water.

**East End Observation Wells**

The Authority monitored 4 observation wells in the East End lens during the wet season. Two of the wells are in the brackish water zone. The 1994 data are summarised in the following table:

East End Observation Wells Monitoring Results		
	Percentage with Total coliform bacteria $\geq 10$ cfu/100ml	Percentage with Faecal coliform bacteria $>0$ cfu/100ml
Wet Season (Oct)	80	50

Samples of water from the East End reservoir were analysed overseas for nitrates, various pesticides and disinfection by-products such as THMs and TOHs. The results showed that no pesticides or their derivatives were detectable in the water. The disinfection by-products results were acceptable. Nitrate levels were within the WHO drinking water quality guidelines.

**Lower Valley Domestic Wells**

Selected domestic wells in the Lower Valley area are routinely tested for total and faecal coliform bacteria, TDS, EC, and pH. These analyses are carried out during the dry season (31 wells) and the wet season (34 wells). The 1994 data are summarised in the following table:

Lower Valley Domestic Wells Monitoring Results			
	Percentage with Total coliform bacteria $\geq 10$ cfu/100ml	Percentage with Faecal coliform bacteria $>0$ cfu/100ml	Percentage with EC $\geq 1600\mu S/cm$
Dry Season (Mar)	9	6	19
Wet Season (Oct)	24	12	44

Samples of water from the Lower Valley reservoir were analysed overseas for nitrates, various pesticides and disinfection by-products such as THMs and TOHs. The results showed that no pesticides or their derivatives were detectable in the water. The disinfection by-products results were acceptable. Nitrate

levels were within the WHO drinking water quality guidelines.

**Sewage Treatment Works**

Monitoring of the performance of the sewage treatment works continued on a fortnightly basis. Eleven pumping stations continued to be monitored weekly for electrical conductivity (EC). The results were used to monitor the integrity of the rehabilitated sewer lines.

BOD and faecal coliform removal efficiencies of the waste stabilisation ponds further improved in 1994. This is directly correlated to the reduced hydraulic loading and reduced salinity of the raw sewage entering the system.

The stabilisation ponds performed as expected with the levels of salinity experienced and the hydraulic loading.

**Operational Performance of the Sewage Treatment Works**

Year	Average BOD-5 day mg/l			Average EC $\mu S/cm$
	Raw sewage	Final effluent	% age removal	Raw sewage
1988	213.0 (g)	13.0 (g)	94.0	3787 (g)
1989	174.0 (g)	36.0 (g)	80.0	6551 (g)
1990	103.5 (c)	25.4 (g)	75.0	11955 (c)
1991	76.4 (c)	20.8 (g)	73.0	16749 (c)
1992	68.9 (g)	19.6 (g)	71.5	21282 (g)
1993	94.2 (g)	22.8 (g)	75.8	17462 (g)
1994	117.6 (c)	26.0 (g)	77.9	13303 (c)

NOTE: BOD = Biochemical Oxygen Demand; EC electrical conductivity; g = grab sample; c = 24hr composite sample.

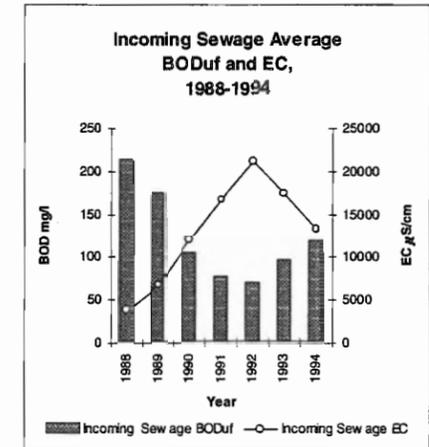
**Operational Performance of the Sewage Treatment Works**

Year	Average FC cfu/100ml		
	Raw sewage	Final effluent	% age reduced
1988	$4.39 \times 10^6$	$1.68 \times 10^3$	99.962
1989	$1.62 \times 10^8$	$2.87 \times 10^3$	99.998
1990	$3.18 \times 10^8$	$7.30 \times 10^3$	99.998
1991	$2.77 \times 10^6$	$1.55 \times 10^4$	99.440
1992	$1.52 \times 10^6$	$5.84 \times 10^3$	99.616
1993	$3.22 \times 10^6$	$4.26 \times 10^3$	99.868
1994	$9.29 \times 10^7$	$2.04 \times 10^4$	99.904

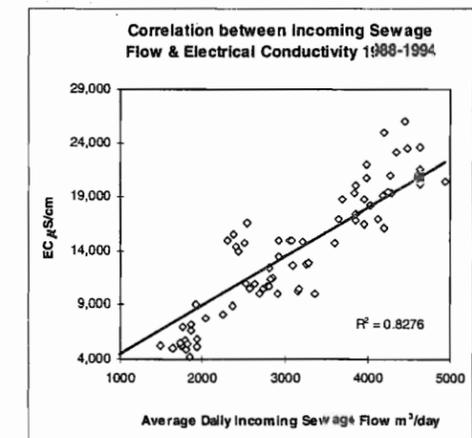
NOTE: FC Faecal coliform bacteria; cfu = colony forming units; g = grab sample; c = 24hr composite sample.

The first graph compares the EC and the unfiltered BOD of the raw sewage since the

West Bay Beach Sewerage System was commissioned in 1988. It shows that further decline of raw sewage salinity continued to coincide with an increase in BODuf (unfiltered) concentration in 1994. The concentration of the BODuf in the sewage increased as the effect of dilution (due to saline groundwater infiltration) on the inflow diminished.



The second graph illustrates the correlation between the EC and the average daily flow to the works. The excellent correlation these two parameters indicates that the rehabilitation of the sewers has been successful in reducing the flow due to infiltration of saline groundwater. The salinity (EC) of the raw sewage was reduced by more than 50%.





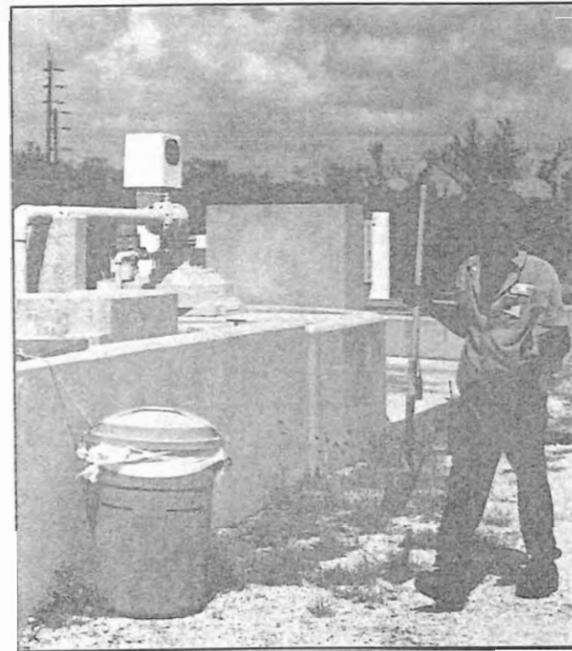
Vernel Rankine checks a ground water level recorder in Lower Valley.



Noel Chisholm, the recipient of the 1993 Chairman's Award, poses for a photo.



Noel Chisholm makes a short acceptance speech at the Chairman's Award dinner while the Hon. McKeeva Bush looks on.



Calvin Ramoon prepares to "rake the screen" at the sewage treatment works.

capability of completing service connections in rock areas, which were previously handled by Petroservicios Ltda.

Customer Group Summary Public Water Supply Grand Cayman						
Month	Single Resident	Multi-Resident	Commercial	Public Authority	Truck	Total
Dec-93	3245	67	445	67	7	3831
Jan-94	3270	67	441	67	7	3852
Feb-94	3366	67	448	68	7	3956
Mar-94	3412	68	450	69	7	4006
Apr-94	3466	67	452	70	7	4062
May-94	3509	67	453	71	7	4107
Jun-94	3587	67	456	72	7	4189
Jul-94	3738	61	500	72	7	4378
Aug-94	3775	61	501	72	7	4416
Sep-94	3871	62	543	80	7	4563
Oct-94	3906	62	546	81	7	4602
Nov-94	3944	61	563	82	7	4657
Dec-94	3955	61	558	84	7	4665

1994 also saw a 19.5% increase in total water sales. Average daily water sales for 1994 was 3079.1 m<sup>3</sup>.

The new water pumping station which was commissioned in 1993 continued to function extremely well during the year. System pressure is maintained at 60 psi and there have been virtually no complaints of inadequate water pressure/supply from customers on our system except at the extremities of the system. A new pumping station and reservoir is being planned for construction at Lower Valley sometime next year to eliminate these problems. Pumping station efficiency averaged 0.221 KwH/Cub m for the year.

Operations Summary Public Water Supply Grand Cayman	
Total Water Produced (m3)	1,182,103
Total Water Sold (m3)	1,123,872
Pipeline Sales (m3)	1,085,594
Trucked Sales (m3)	38,278
Other Sales (m3)	0
Unaccounted for Water (%)	4.58%
Number of Pipeline Customers (ea)	4,658
Average Daily Water Sales (m3)	3,079.10
Daily Water Sales as % of Total Capacity	64%
Water Purchased from CWC (m3)	10,980
Water Sold to CWC (m3)	16,871
Electricity consumed (kWhrs)	250,740
Pump Station Efficiency (kWhrs/m3)	0.221

Central De-Sal continued to supply water quantities below the contractual minimums even after plant modifications by Ahlstrom Inc. of the USA. This forced the Authority to

purchase water from Cayman Water Company in order to make up quantities during the months of January, February, April and June.

Ocean Conversion Ltd. continued to provide a first class service, ending the year with an expanded production capacity of 4000 Cub m per day. They also have commenced construction of a new building to house new diesel-driven pumps which they have contracted to be on line early next year. When completed, they will have greatly expanded capability for producing fresh water, at a lower unit cost to the Authority. Ocean Conversion have also completed the energy recovery system modification to their plant.

Average Monthly Consumption per Consumer Group (m3) Public Water Supply Grand Cayman						
Month	Single Resident	Multi-Resident	Commercial	Public Authority	Total Pipeline	Truck
Dec-93	13.42	97.69	35.58	72.22	18.51	328.84
Jan-94	16.44	114.88	46.44	107.93	23.19	443.19
Feb-94	14.08	109.83	42.02	103.10	20.40	588.16
Mar-94	15.66	132.89	42.86	104.58	22.25	820.69
Apr-94	17.12	127.06	42.09	113.45	23.38	756.61
May-94	14.60	106.26	37.63	101.66	20.15	344.96
Jun-94	17.81	108.92	41.78	116.30	23.58	633.47
Jul-94	15.17	115.05	44.79	104.77	21.43	516.26
Aug-94	15.60	142.80	41.73	86.37	21.49	1096.26
Sep-94	12.60	130.40	36.46	100.08	18.58	190.24
Oct-94	12.24	146.58	35.67	156.24	19.37	261.14
Nov-94	13.38	126.57	34.05	84.87	18.63	678.17
Dec-94	12.66	124.78	34.51	94.45	14.51	1237.83

The average monthly unaccounted for water increased slightly from 3.15% in 1993 to 4.58% in 1994. This has been attributed to several major pipe breaks on the distribution system in the Prospect area. An analysis of pipe break occurrences and construction records was undertaken and it was determined that the suspect section of pipeline was installed without adequate construction supervision in 1990. This section will continue to be monitored and it is intended that it will be replaced after the Lower Valley Pumping Station is on line.

**Water Truckers**

Five water truckers continue to provide water to customers not served by pipeline. These are as follows:

- C.L. Flowers and Sons.
- Mr. Wilford Ryan
- Thompson Water Services
- Mr. H. A. Bodden
- Mr. Brasley McLean

The Authority also operates a water trucking service on Cayman Brac. Daily trucked water demand decreased by 26% to approximately 46,541 US Gallons.

Operations Summary				
Public Water Supply Cayman Brac				
	1994	1993	1992	1991
Total Water Produced (m3)	31,893	24,069	22,642	11,022
Total Water Sold (m3)	32,477	24,247	22,781	8,815
Pipeline Sales (m3)	26,023	19,605	20,249	8,265
Trucked Sales (m3)	6,454	4,642	2,532	549
Other Sales (m3)	0	0	0	0
Unaccounted for Water (%)	-1.83%	-1.01%	-1.66%	-6.37%
Number of Pipeline Customers (ea)	56	51	49	40
Average Daily Water Sales (m3)	88.98	66.43	62.41	48.30
Daily Water Sales as % of Total Capacity	39%	29%	27%	21%

### Cayman Brac Water Supply

The West End Water Works experienced a significant 33% growth in sales for the year. This growth can be attributed to the two hotels coming on line full time this year. The price of water was reduced in late December by 15% to encourage the hotels to connect. At year's end there were 56 customers being served by the pipe distribution system. The WEW continues to experience negative water loss figures. The Authority employs only 2 persons on Cayman Brac.

Avg. Monthly Consumption per Consumer Group (m3)				
Public Water Supply Cayman Brac				
Month	Single			Trucker
	Resident	Commercial	Public Authority	
Dec-93	7.88	60.38	9.80	8.46
Jan-94	10.40	73.27	10.27	10.97
Feb-94	9.76	112.79	13.13	9.51
Mar-94	11.40	94.37	15.97	10.54
Apr-94	11.04	117.19	22.77	10.10
May-94	10.47	110.41	21.80	10.93
Jun-94	10.95	162.31	33.23	9.46
Jul-94	13.00	133.97	21.07	9.28
Aug-94	12.05	100.91	8.07	8.29
Sep-94	12.06	122.91	9.13	8.86
Oct-94	10.23	101.33	16.03	7.47
Nov-94	10.93	127.32	11.87	7.12
Dec-94	11.13	112.37	10.63	7.90

### Water Rates

Water rates remained the same as 1993 in Grand Cayman. The piped water rate for

Cayman Brac was lowered from \$6.60 to \$5.28 per cubic metre in December 1993 (with effect January 1994) in order to attract the business of a hotel which had previously used its own water production plant.

Meter rental rates remained the same as 1993 and vary from \$5.00 to \$58.00 per month depending on the size meter.

The Authority charges a minimum monthly charge which is comprised of the meter rental plus 4.0 m3 of water consumption. Therefore the minimum charge varies according to meter size and consumer type.

Water Rates 1994		
Groundwater	\$2.20 per m <sup>3</sup>	\$8.33/ 1000 US Gals
Desalinated water-GCM		
Residential 1st 12 m <sup>3</sup>	\$3.78 per m <sup>3</sup>	\$14.31/ 1000 US Gals
over 12 m <sup>3</sup>	\$4.54 per m <sup>3</sup>	\$17.18/ 1000 US Gals
Commercial/Industrial	\$4.54 per m <sup>3</sup>	\$17.18/ 1000 US Gals
Public Authority	\$4.10 per m <sup>3</sup>	\$15.52/ 1000 US Gals
Trucker	\$3.78 per m <sup>3</sup>	\$14.31/ 1000 US Gals
Desalinated water-CYB		
Piped water	\$5.28 per m <sup>3</sup>	\$19.98/ 1000 US Gals
Trucked water	\$6.60 per m <sup>3</sup>	\$24.98/ 1000 US Gals

### SEWERAGE OPERATIONS

#### West Bay Beach Sewerage System

A closed circuit TV (CCTV) survey of all U-Lined sewer pipes of the WBBS System was undertaken during 1994 in order to assess whether there were any potential problems with this method of repairing the pipes. This was due to the fact that 2 of the U-lined pipes re-inverted and caused partial blockages of the sewers. The survey did not detect any potential problems. A survey of the unlined 100mm and 150mm diameter sewer pipes below groundwater table was also completed at the same time. The latter survey indicated that 240 metres of 100mm diameter sewer pipes and 330 meters of 150mm diameter pipes were in need of structural repair/lining. Madsen-Barr Corporation is scheduled to complete this U-lining work early next year. The Operations Section of the Authority completed both of these surveys.

Sewerage Revenue Summary					
Month	Sewage Revenue	No. Users	Septic Revenue	No. Users	# of Loads
Jan-94	\$139,090.00	242	\$2,040.00	6	128
Feb-94	\$136,748.40	240	\$1,920.00	6	121
Mar-94	\$139,576.52	243	\$2,340.00	6	147
Apr-94	\$139,910.92	244	\$1,890.00	6	119
May-94	\$138,450.80	247	\$2,220.00	6	140
Jun-94	\$140,455.36	250	\$2,160.00	6	136
Jul-94	\$141,867.64	250	\$436.85	2	27
Aug-94	\$140,355.60	253	\$735.00	2	46
Sep-94	\$141,007.14	253	\$765.96	2	48
Oct-94	\$143,998.49	256	\$884.02	2	56
Nov-94	\$142,415.00	258	\$630.00	2	40
Dec-94	\$142,202.80	260	\$3,471.76	4	218

Results of the extensive manhole and sewer system survey which was undertaken last year indicated that 38 manholes are in very bad condition and require internal structural lining in order to prevent further deterioration and possible collapse. Tender documents for this rehabilitation work were being prepared at year's end. It is anticipated this work will be completed in 1995.

Customer connections during the year increased by 7% to a total of 260. Revenue generated from sewage increased by only 1.5%. The Authority also assumed responsibility for maintaining and operating the sewerage system of the Safehaven Development.

A "complete condition" survey of the Sewage Treatment Works commenced in 1994 and results/recommendations will be available early next year. This report will also include a hydraulic re-design of the effluent disposal system. It is anticipated that rehabilitation work on the Treatment Works will be completed in 1995.

A detailed survey of sludge quantities in each pond was undertaken in 1994. Results indicate that Pond 1.1 has an accumulated sludge volume of 15%, Pond 1.2 13%, Pond 2.1 7% and Pond 2.2 6%.

A new control panel for the Pista Grit Trap was installed in October to replace the original panel which was commissioned in 1988.

Operational Statistics			
West Bay Beach Sewerage System			
	1994	1993	1992
Total Sewage Treated	1,074,304	1,175,772	1,889,617
Average Daily Flow	2,943	3,221	3,529
Average Daily Septage	13	18	16
Pumping Stations Electricity	174,010	208,417	302,331
Pumping Stations Efficiency	0.16	0.18	0.16
Treatment Works Electricity	125,400	137,200	186,800
Treatment Works Efficiency	0.12	0.12	0.10
Aspirator Electricity	-	71,100	47,640
Aspirator Efficiency	-	0.06	0.03
Total Electricity	0.28	0.36	0.30
Total No of Connections	260	243	238
Total Sewerage Fee Charged	\$1,686,079	\$1,661,643	\$1,614,851
Monthly Average Charge per Connection	\$540	\$570	\$565
Total No of Septage Customers	4	6	5
Total Septage Fee	\$19,494	\$25,200	\$22,590
Monthly Average Cost per Customer	\$406	\$350	\$377

### Sewerage Rates

Sewerage rates remained the same as those of 1993.

Sewerage Rates	
Group	SFU's per ft <sup>2</sup>
<b>Commercial</b>	
Store	0.0275
Office	0.0375
Beauty salon, surgery, bar, club, water sports	0.0475
Food handling, garage, photo lab	0.0575
<b>Residential and Hotels</b>	
Residential bedroom	6
Residential bathroom	14
Hotel room	18
Rate per sewerage fixture unit (SFU)	\$1.40 per month

### NEW WORKS

#### George Town Sewerage

Proper sewage treatment and disposal remains a serious concern of the Water Authority.

Due to other commitments no further work was carried out on the pre-feasibility study for a sewerage system for North and Central George Town. However it is anticipated that this study will be continued in late 1995, and a preliminary report will be presented to Government in early 1996.

The Water Authority continued to review the wastewater treatment and disposal systems for all new developments at the planning stage, with the exception of single houses and

duplexes which are reviewed by the Building Control Unit. More than 130 new developments were reviewed in 1994.

**Bodden Town Water Supply -1994 events**

The civil engineering contractor, Petroservicios Ltda. completed the Bodden Town Water Supply Project by mid - May 1994.

The following areas were provided with piped water during the year:

- Manse Road
- Pease Bay Colony (Selina Avenue, Elizabeth Way)
- Belford Estates
- Plum Tree Lane (Northward)
- Jayson Boulevard (Phase 2)
- Jackson Boulevard (Newlands)
- Arlene Street (North Sound Estates)
- Savannah Acres,
- Omega Bay Gardens,
- Admiral's Landing sub-division (Phase 1)

In January 1994 a rate increase, calculated in accordance with the Conditions of Contract, was given to the civil engineering contractor. This increase averaged 3.50% and equaled the cost of living index (CPI) increase over the preceding twelve months.

The civil engineering contractor installed 165 meter boxes during the year, mainly in the areas covered by phase 2 (Northward) and phase 3 (Bodden Town) of the extension to Pease Bay.

**Bodden Town Water Supply Project - Summary**

In total 88,270 metres of pipes were installed on the Bodden Town Water Supply Project, in sizes varying from 63mm (2") to 300mm (12") in diameter, for a total installation cost of CI\$4,543,034.48.

The following table indicates the pipe laying

cost, the amount of rock, and the reinstatement of paved areas on the three phases of the extension to Pease Bay. It can be clearly seen from this table that the third phase of the extension to Pease Bay was significantly more expensive than the first two phases, primarily caused by the significantly higher percentage of large diameter pipe laid and the amount of rock encountered.

	Pipelaying Costs			
	Percent. of large dia. pipe	Rock Excavation( cu.m/m pipe)	Road Reinstatement (m/m pipe)	Pipe laying Cost (per metre pipe)
Phase 1	25.1 %	0.095	46.3 %	CI\$ 48.53
Phase 2	23.0 %	0.202	62.9 %	CI\$ 50.22
Phase 3	39.3 %	0.200	54.6 %	CI\$ 58.58
<b>Overall</b>	<b>27.4 %</b>	<b>0.153</b>	<b>53.6 %</b>	<b>CI\$ 51.22</b>

The overall pipelaying cost of the Bodden Town Water Supply Project of CI\$51.22 per metre pipe reflects an 25% increase compared to the average pipelaying cost of CI\$41.02 per metre of the original George Town Water Supply Project in 1987-1989. It must be noted however that the rise in inflation over the same period was almost 40%.

By the end of 1994 the civil engineering contractor and the Water Authority combined had installed a total of 1,541 meter boxes in the entire water distribution area (Since December 1, 1991, the date Petroservicios commenced with the Bodden Town Water Supply project). This represents 61.6 % of the estimated amount for the total Bodden Town Water Supply Project.

**Additional Water Storage Tank at Red Gate Lane**

The expansion of the water distribution system and the subsequent increased water demand necessitated the expansion of the existing water storage capacity. In late 1993, following a competitive tendering procedure, a factory-coated bolted steel tank with a storage capacity of 3,000 m<sup>3</sup> (792,000 US gallons) was purchased from the Kansas U.S.A. - based



*New 3,000 m<sup>3</sup> bolted steel reservoir under construction by Petroservicios Ltda. at the Water Authority compound on Red Gate Road in March 1994.*



*Petroservicios Ltda. carrying out some final pipelaying work on the Bodden Town Water Supply extension which was completed in May 1994.*

company Columbian Steel Tank Co. This circular tank has a diameter of 25.9m (85 feet) and a tank wall height of 7.62m (25 feet). Following another competitive tender procedure the contract for the erection of this tank was awarded to the lowest bidder, Petroservicios Ltda. who successfully completed the construction by mid-April 1994. The total water storage capacity at Red Gate Lane is now 12,000 m<sup>3</sup> (3.2 million US gallons).

**George Town Hospital Sewage Treatment Plant**

In early 1994 it was determined that the existing wastewater treatment plant at the (soon to be upgraded) George Town hospital did not function properly. The physical structure had become unsafe, and did not warrant the expense of any remedial work. The Ministry of Health, Drug Abuse Prevention and Rehabilitation requested that the Water Authority take on the responsibility to design, prepare the tender documents, review the returned tenders and supervise the construction of a new treatment plant and all associated work.

The Water Authority initially designed a system which would combine the sewage flows from the adjacent properties (Pines retirement home, Lighthouse school, and the Children's Centre) with the waste flows from the hospital for treatment in one centralized plant. Due to financial constraints however the design was amended to only allow for treatment of the wastewater generated by the hospital.

In late December 1994 the tender documents for the above mentioned Contract were sent to four pre-qualified local contractors.

**Drawing Office**

The drawing office worked on a number of projects during 1994 including several maps for groundwater studies of Cayman Brac and East End. Construction drawings were

produced for the reservoir addition at Red Gate Lane, and preliminary drawings were produced for the Authority's Planning Department application for the Lower Valley Reservoir and Pumping Station.

The drawing office continued to carry out regular updates of record drawings for the Authority's public water and sewerage systems. The staff attended an AutoCad workshop in April which was intended to sharpen their CAD skills.

**WATER AND SEWERAGE OPERATORS**

**Well Drillers**

Five well drillers were re-licenced by the Authority in 1994. They were Watler and Hislop Plumbing Services (2 licences), Industrial Services and Equipment Ltd. (2 licences), and Webb and Wright Well Drilling Company (1 licence).

**Septage Haulers**

Three septage haulers were re-licenced in 1994. They were Harris Wright, Industrial Services and Equipment Ltd., and James Pearcey.

**Plumbers Licencing**

The Plumber's Examination Board met on three occasions to review applications.

Theoretical examinations were held on four occasions during the year to assess applicant's ability. The following licences were approved by the Board in 1994.

	1994 Licences	Total No. to 31.12.94
Apprentice	4	61
Journeyman	4	94
Master	0	29

Members of the Plumber's Examination Board are:

<b>Chairman:</b>	Mr. Thomas Hill Operations Manager, Water Authority
<b>Members:</b>	Mr. Deepatilaka Gunawardena Deputy Director of DOE
	Mr. Delano Hislop
	Mr. Arthur Arch Plumbing Inspector, BCU
<b>Secretary:</b>	Mrs. Annette McCoy Administrative Assistant, Water Authority

*The Ministry of Community Development, Sports, Women's and Youth Affairs, and Culture*

**THE WATER AUTHORITY OF THE CAYMAN ISLANDS**

**FINANCIAL STATEMENTS 1994**

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Water Authority of the Cayman Islands

**CERTIFICATE OF THE AUDITOR GENERAL**  
*[See also Report of the Auditor General, 1994]*

*To the Members of the Water Authority of the Cayman Islands  
and the Financial Secretary of the Cayman Islands*

In accordance with the provisions of Section 8 (7) of the Water Authority Law, 1982, Section 8 (F) (1) of the Water Authority (Amendment) Law, 1987, and Section 44 (1) of the Public Finance and Audit Law, 1985, I have audited the financial statements of the Water Authority of the Cayman Islands for the year ended 31st December, 1994, as set out on pages 29 to 39. These financial statements are the responsibility of the Water Authority's management. My responsibility is to express an opinion on these financial statements based on my audit.

My examination was made in accordance with generally accepted auditing standards which require that I plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. I believe that my audit provides reasonable basis for my opinion.

As disclosed in Note 10 to the financial statements, the Water Authority has earned \$137,751 comprising \$47,751 for late charges on customers' overdue balances and \$90,000 (estimated) for minimum monthly charges in excess of the standard charge for water supply. The Legal Department of the Cayman Islands Government is of the opinion that these transactions are outside the Water Authority's statutory powers and are therefore *ultra vires*.

Except for the *ultra vires* income of \$137,751, in my opinion these financial statements present fairly in all material respects the financial position of the Water Authority of the Cayman Islands as of 31st December, 1994, and of the results of its operations and its cash flows for the year then ended, in accordance with International Accounting Standards and the Water Authority Law, 1982, as amended.

N. K. Esdaile  
Auditor General  
15th September 1995

## Water Authority of The Cayman Islands

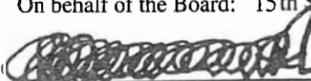
## Balance Sheet

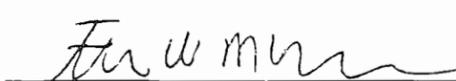
As At 31st December 1994

(Stated in Cayman Islands Dollars)

	Notes	1994	1993
<b>CURRENT ASSETS</b>			
Cash On Hand		1,450	1,250
Cash At Bank		374,796	314,431
Cash On Fixed Deposit		693,211	857,376
<b>Total Cash &amp; Cash Equivalents</b>		<b>1,069,457</b>	<b>1,173,057</b>
Accounts Receivable	3	881,293	700,653
Inventory		11,065	-
Prepaid Expenses		15,255	20,611
<b>Total Current Assets</b>		<b>1,977,070</b>	<b>1,894,321</b>
<b>CURRENT LIABILITIES</b>			
Bank Overdraft - Secured	4	372,051	-
Accounts Payable		196,433	158,120
Contract Retention Payable		64,063	188,822
Interest Payable	5	395,558	338,640 *
Customer Deposits		363,220	407,762
Customer Project Loans	6	82,691	-
Current Maturities On Long Term Liabilities	9	1,829,403	1,600,605
<b>Total Current Liabilities</b>		<b>3,303,419</b>	<b>2,693,949</b>
<b>NET CURRENT LIABILITIES</b>		<b>(1,326,349)</b>	<b>(799,628)</b>
<b>FIXED ASSETS</b>			
Land	7	565,264	565,264
Water Supply System	7	16,442,511	14,055,424
Sewerage System	7	9,769,676	10,013,054
Other Assets	7	376,535	319,409
Construction in Progress	7	21,196	1,916,779
<b>Total Fixed Assets</b>		<b>27,175,182</b>	<b>26,869,930</b>
<b>TOTAL ASSETS LESS CURRENT LIABILITIES</b>		<b>25,848,833</b>	<b>26,070,302</b>
<b>LONG TERM LIABILITIES</b>	9	<b>(22,474,008)</b>	<b>(23,506,505)</b>
<b>NET ASSETS</b>		<b>\$3,374,825</b>	<b>\$2,563,797</b>
<b>EQUITY REPRESENTED BY:</b>			
Contributed Capital	8	600,245	598,940 *
Retained Earnings		2,774,580	1,964,857 *
<b>Total Equity</b>		<b>\$3,374,825</b>	<b>\$2,563,797</b>

On behalf of the Board: 15th September 1995

  
 Hon. W. McKeever Bush, MLA, JP  
 Chairman

  
 Frederick McTaggart  
 Acting Director

\* Restated to conform with the current year presentation  
 The accompanying notes form an integral part of the financial statements

## Water Authority of The Cayman Islands

## Statement of Income and Expenses

For the Year Ended 31st December, 1994

(Stated in Cayman Islands Dollars)

	Notes	1994	1993
<b>INCOME</b>			
Gross operating revenue	10	7,467,689	6,566,996
Less: Operating expenses		5,597,356	5,553,298
<b>Gross operating surplus for year</b>		<b>1,870,333</b>	<b>1,013,698</b>
Sundry income		361,276	322,225 *
<b>Operating surplus for year</b>		<b>2,231,609</b>	<b>1,335,923</b>
<b>OTHER EXPENSES</b>			
Administrative		868,113	652,835 *
Foreign exchange loss		303,773	110,518
		<b>1,171,886</b>	<b>763,353</b>
<b>Net surplus for year before extraordinary items</b>		<b>1,059,723</b>	<b>572,570</b>
<b>Extraordinary Items:</b>			
Arbitration award		-	682,832
Extraordinary expense		-	(106,632)
<b>Net surplus for year</b>		<b>1,059,723</b>	<b>1,148,770</b>
<b>Retained Earnings at Beginning of Year</b>			
Balance as previously stated		2,626,662	2,128,489
Less: Prior year adjustment	11	(661,805)	(612,402)
Restated balance		<b>1,964,857</b>	<b>1,516,087</b>
<b>Retained Earnings before Contribution to Government</b>		<b>3,024,580</b>	<b>2,604,857</b>
<b>Contribution to Government</b>		<b>(250,000)</b>	<b>(700,000)</b>
<b>Retained Earnings at End of Year</b>		<b>\$2,774,580</b>	<b>\$1,904,857</b>

\* Restated to conform with the current year presentation.  
 The accompanying notes form an integral part of the financial statements.

**Water Authority of The Cayman Islands**  
**Statement of Expenses**  
**For the Year Ended 31st December, 1994**  
(Stated in Cayman Islands Dollars)

	Notes	1994	1993
<b>OPERATING EXPENSES</b>			
Salaries		769,566	637,667
Wages		93,316	111,506
Water Purchase		2,707,638	2,482,141
Repairs and Maintenance		74,385	488,323
Supplies		72,789	79,545
Electricity		111,247	129,361
Depreciation Expense	7	685,375	602,005
Lease Expense	14	6,250	6,250
Loan Interest		1,067,747	991,255
Arbitration Costs		-	18,084
Miscellaneous		9,043	7,161
<b>Total Operating Expenses</b>		<b><u>5,597,356</u></b>	<b><u>5,553,298</u></b>
<b>ADMINISTRATIVE EXPENSES</b>			
Salaries		311,242	227,610
Staff Training and Benefits		186,382	112,600
Office and Lab Supplies		34,469	33,351
Licenses and Dues		9,219	18,735
Telephone and Utilities		18,381	18,054
Office Rental	14	27,912	27,912
Insurance		90,606	80,007
Interest on Customer Deposits		21,155	16,264 *
Repairs and Maintenance		2,223	1,586
Bad Debt Expenses		44,953	9,556
Depreciation Expense	7	37,033	30,431
Miscellaneous		84,538	76,729
<b>Total Administrative Expenses</b>		<b><u>868,113</u></b>	<b><u>652,835</u></b>
<b>TOTAL ADMINISTRATIVE AND OPERATING EXPENSES</b>		<b><u>\$6,465,469</u></b>	<b><u>\$6,206,133</u></b>

\* Restated to conform with current year presentation.  
The accompanying notes form an integral part of the financial statements.

**Water Authority of The Cayman Islands**  
**Statement of Cash Flows**  
**For the Year Ended 31st December 1994**  
(Stated in Cayman Islands Dollars)

	1994	1993
<b>CASH FLOWS FROM OPERATING ACTIVITIES</b>		
Net Surplus for year before extraordinary items	1,059,723	572,570 *
Adjustments to reconcile net surplus before extraordinary items to net cash provided by operating activities		
Depreciation	722,408	632,436
Foreign Exchange Loss	303,773	110,518
Extraordinary Expense	-	(106,632)
	<u>2,085,904</u>	<u>1,208,892</u>
Net Change in Non-Cash Working Capital		
Accounts Receivable	(180,640)	(52,274)
Inventory	(11,065)	-
Prepaid Expenses	5,356	(11,246)
Accounts Payable	38,313	(50,551)
Contract Retention Payable	(124,759)	-
Interest Payable	56,918	25,853 *
Customer Deposits	(44,542)	60,188
Customer Project Loans	82,691	-
<b>Net Cash Provided By Operating Activities</b>	<u>1,908,176</u>	<u>1,180,862</u>
<b>CASH FLOWS FROM INVESTING ACTIVITIES</b>		
Cost of Fixed Assets Purchased	(409,505)	(1,900,455)
Construction in Progress	(618,155)	(1,139,152)
Contributed Capital	1,305	33,139 *
Arbitration Award		682,832
<b>Net Cash Applied In Investing Activities</b>	<u>(1,026,355)</u>	<u>(2,323,636)</u>
<b>CASH FLOWS FROM FINANCING ACTIVITIES</b>		
Repayment of Long Term Debt	(1,588,138)	(584,954)
Proceeds of Long Term Debt	480,666	3,712,632
Overdraft Facilities	372,051	(564,986)
Contribution to Government	(250,000)	(700,000)
<b>Net Cash ( Used )/ Provided By Financing Activities</b>	<u>(985,421)</u>	<u>1,862,692</u>
Net (Decrease)/Increase In Cash & Cash Equivalents During the Year	(103,600)	719,918
Cash & Cash Equivalents at the Beginning of the Year	1,173,057	453,139
<b>Cash &amp; Cash Equivalents at End of Year</b>	<b><u>\$1,069,457</u></b>	<b><u>\$1,173,057</u></b>

**Water Authority of The Cayman Islands**  
**Notes to the Financial Statements**  
**For the Year Ended 31st December 1994**  
(Stated in Cayman Islands Dollars)

**1. Background Information**

The Water Authority of the Cayman Islands ("the Water Authority") is a statutory body established on 1st January 1990 under the Water Authority Law (Law 18 of 1982), as amended.

The Water Authority is principally engaged in the management of water supply and sanitation affairs of the Cayman Islands including the provision of public water supplies, sewerage systems and the management, development and protection of water resources.

**2. Significant Accounting Policies**

The significant accounting policies adopted by the Water Authority in these financial statements are as follows:

*(a) Basis of accounting*

The financial statements of the Water Authority are prepared under the historical cost convention and are in accordance with International Accounting Standards.

*(b) Depreciation*

Fixed assets, with the exception of freehold land, are depreciated on a straight line basis to write off the cost of each asset over its useful life as follows:

Water and Sewerage Systems	15 - 50 Years
Machinery and Equipment	10 Years
Other Assets	5 - 10 Years

*(c) Foreign currency translation*

Assets and liabilities denominated in currencies other than Cayman Islands Dollars are translated at exchange rates in effect at the balance sheet date.

Revenue and expense transactions denominated in currencies other than Cayman Islands Dollars are translated at exchange rates ruling at the date of those transactions.

Gains and losses arising on exchange are included in the Statement of Income and Expenses.

*(d) Allowance for bad debts*

The allowance for bad debts is established through a provision for bad debts charged to expenses. Accounts receivable are written off against the allowance when management believes that the account is un-collectible. The allowance is an amount

**2. Significant Accounting Policies (cont.)**

that management believes will be adequate to cover any bad debts, based on an evaluation of collectibility and prior bad debts expense.

*(e) Inventory*

Inventory of office supplies are accounted for on the first-in, first-out basis, and are stated at the lower of cost and net realizable value.

*(f) Cash & cash equivalents*

For the purpose of the Statement of Cash Flow, cash and cash equivalents are considered as cash held on demand and fixed deposits with an original maturity of three months or less.

**3. Accounts Receivable**

	<u>1994</u>	<u>1993</u>
Accounts Receivable	927,358	706,646
Provision for Bad Debts	(46,065)	(5,993)
	<u>\$881,293</u>	<u>\$700,653</u>

**4. Bank Overdraft**

The bank overdraft is secured by a guarantee from the Government of the Cayman Islands.

**5. Interest Payable**

	<u>1994</u>	<u>1993</u>
Long Term Liabilities	311,538	275,775
Customer Deposits	84,020	62,865
	<u>\$395,558</u>	<u>\$338,640</u>

The Water Authority Regulations, 1988 specifies that interest be calculated on customers' deposits at the rate of 5% per annum from the date of payment of the deposits, and the interest earned shall be added to the customers' deposits.

**6. Customer Project Loans**

Customer project loans represent balances outstanding at the year-end in respect of funds collected from private individuals to carry out capital works in the South Sound area of George Town, in 1989. These funds are interest free and are repayable by way of a 10% rebate on the individuals' annual water consumption charges. In previous years these amounts were included within customer deposit balances.

**7. Fixed Assets**

Cost	Freehold Land	Water Supply	Sewerage	Other Assets	Construction in Progress	Total
At 31 December 1993	565,264	15,008,465	10,948,032	585,715	1,916,779	29,024,255
Additions	-	243,288	-	166,217	618,155	1,027,660
Transfers	-	2,513,738	-	-	(2,513,738)	-
Adjustments	-	191,861	221,090	37,372	-	450,323
At 31 December 1994	565,264	17,957,352	11,169,122	789,304	21,196	30,502,238
<b>Accumulated depreciation</b>						
At 31 December 1993	-	953,041	934,978	266,306	-	2,154,325
Charge for Year	-	369,939	243,378	109,091	-	722,408
Adjustments	-	191,861	221,090	37,372	-	450,323
At 31 December 1994	-	1,514,841	1,399,446	412,769	-	3,327,056
<b>Net Book Value</b>						
31 December 1994	\$565,264	\$16,442,511	\$9,769,676	\$376,535	\$21,196	\$27,175,182
31 December 1993	\$565,264	\$14,055,424	\$10,013,054	\$319,409	\$1,916,779	\$26,869,930

Adjustments comprise the accumulated balance in the depreciation account as at December 31, 1990, which was incorrectly netted off against the cost of fixed assets when the balances were brought forward at January 1, 1991.

The water supply system and sewerage system includes the cost of electrical and mechanical equipment, and machinery.

Interest of \$41,332 (1993: \$57,026) has been capitalized during the year for the water supply extension to Bodden Town.

Other assets includes the costs of tools and equipment, office furniture and equipment, and vehicles.

Construction-in-Progress represents preliminary project expenses incurred in connection with the re-lining of a portion of the West Bay Beach Sewerage System, and costs associated with obtaining planning permission in respect of building a reservoir and a pumping station at Lower Valley.

**8. Contributed Capital**

	1994	1993
Balance at beginning of year	598,940	565,801
Add: Received during year	95,573	33,139
	694,513	598,940
Less: Amount not recovered	(30,268)	-
Transfer to Capital Contribution loan (Note 9)	(64,000)	-
	\$600,245	\$598,940

**8. Contributed Capital (cont.)**

Contributed capital represents funds received from private individuals to fund capital work which was completed by the Water Authority. The relevant costs have been capitalized as water and sewerage works (Note 11).

**9. Long Term Liabilities**

Loans	1994	1993
(a) Canadian Imperial Bank of Commerce Water Supply and Sewerage	11,291,349	11,874,681
(b) Caribbean Development Bank Sewerage Water Supply	5,050,873 1,930,208	5,178,573 2,084,375
(c) Cayman Islands Government Grand Cayman Cayman Brac Medical Expenses	4,822,349 1,053,000 91,632	4,822,349 1,053,000 94,132
(d) Capital Contribution Loan (Note 8)	64,000	-
Total long term liabilities	24,303,411	25,107,110
Less current maturities	(1,829,403)	(1,600,605)
	\$22,474,008	\$23,506,505

(a) The Canadian Imperial Bank of Commerce loans (CIBC) are part of a financing package of US\$16,500,000, which includes a US\$500,000 overdraft facility, that refinanced the previous Barclays Bank loans and the extension of the water supply. The loans are provided at a interest rate of 1% over London Interbank Offered Rate (LIBOR) and are repayable, on a quarterly basis, over a eight year period commencing on January 1, 1994. Annual capital repayments are due as follows:

1995	US\$1,200,000
1996-1998	US\$2,000,000
1999-2000	US\$2,800,000
2001	US\$2,000,000

The CIBC loan is held in the name of the Water Authority and is secured by a guarantee by the Government of the Cayman Islands.

Subsequent to the year-end the Water Authority entered into a loan agreement with CIBC on February 24, 1995 whereby the total financing package offered to the Water Authority was increased from US \$16,500,000 to US \$22,350,000.

**9. Long Term Liabilities (cont.)**

- (b) The Caribbean Development Bank (CDB) sewerage and water supply loans are to be repaid over 15 years at variable interest rates (4%-8.3%). Repayment commenced on the sewerage loan in quarterly installments in June 1991 and on the water supply loan in quarterly installments in March 1992. The repayments currently being made on these loans are approximately US\$46,250 each quarterly, plus interest for the water supply loan and approximately CI\$26,500 each quarterly and CI\$160,000 plus interest semi-annually for the sewerage loan.

The CDB loans are in the name of Government and are on-lent to the Water Authority. The Water Authority is responsible for all interest and principal repayments on these loans.

In March 1995, the additional financing provided by CIBC was used to repay the CDB loan which financed the West Bay Beach Sewerage System.

- (c) The Cayman Islands Government loan for Grand Cayman is interest free and is to be repaid in quarterly installments of CI\$48,223 each, over a period of twenty five years commencing on April 1, 1995. The Cayman Islands Government loan for Cayman Brac has a moratorium on interest until repayments commence and then attracts interest at a fixed rate of 8%. This loan is to be repaid in quarterly installments of \$17,550, over a period of 15 years commencing on April 1, 1995.

The loan payable to the Cayman Islands Government for medical expenses is in respect of injuries incurred by a cyclist in 1991 for which the Water Authority has assumed liability. The loan is interest free and repayable in monthly installments of CI\$2,500 each.

- (d) The capital contribution loan represents the cost of certain capital work carried out in 1991 and funded by a customer to facilitate the Water Authority to construct a pipeline through a third party property to provide the water connection to the customer concerned. The cost of this work was \$64,000. In 1995 management agreed to repay the loan in ten (10) annual installments of \$6,400 each. This loan is interest free and the first installment is due in June 1995.

**10. Gross Operating Revenue**

Gross operating revenue comprises the amount of water sales, sewerage fees, and septage disposal billed to customers during the year.

An amount of \$137,751 is included in the gross operating revenue comprising \$47,751 and \$90,000 (estimated) in respect of late charges on customer overdue balances and minimum monthly water charges, respectively.

**10. Gross Operating Revenue (cont.)**

Legal Department of the Government of the Cayman Islands is of the opinion that the Water Authority is not empowered to levy late charges on overdue balances under the Water Authority Law or Regulations. Water supply customers were subject to a minimum charge under the Water Authority Regulations, 1988. When these regulations were amended in 1991 the minimum charge was omitted. This matter has now been rectified by the Water Authority (Amendment) Regulations, 1995.

**11. Prior Year Adjustment**

	<u>1994</u>	<u>1993</u>
Contributed capital	598,940	565,801
Interest on customer deposits	62,865	46,601
	<u>\$661,805</u>	<u>\$612,402</u>

- (a) **Contributed capital**  
Funds contributed by private individuals to fund capital works which were taken over by the Water Authority were previously credited in the Statement of Income and Expenses, erroneously. As the relevant cost have been capitalized as water and sewerage works, these funds are now included within Contributed Capital (Note 8).
- (b) **Interest on customer deposits**  
In compliance with the Water Authority Regulations, 1988, 5% interest due on the customer deposits are provided for in these financial statements.

**12. Other Operating Expenses**

During the year, the Cayman Islands Government provided at no charge to the Water Authority, legal and a limited amount of personnel services. In addition, the Water Authority provided at no charge to the Government the availability and use of water for fire fighting, disposal of septage collected by the Department of the Environment, free sewerage service to a number of indigent persons in the Watler's Road area, supervision of water resources, administration of Plumbers Examination Board, consultative services for development control, and water at a reduced Public Authority rate.

**13. Pension**

In August 1993, the Governor approved the inclusion of the Water Authority's staff as being in employment under the term "Public Service" for the provision of The Pension Law. At that time all employees who had been "seconded" from the Public Service Commission resigned and were employed directly by the Water Authority. The pension contributions for those employees and subsequent eligible Caymanian employees hired by the Water Authority were paid directly to the Cayman Islands Government, who will in turn, bear all and any future pension liability due to these staff members.

**14. Leases**

Property is leased in Lower Valley on which is situated the groundwater reservoir and treatment works. The annual cost of this lease (\$6,250) is treated as an operational cost. The Water Authority leases office space from the Cayman Islands Government for its administrative office at a cost of \$2,326 per month on a month to month basis.

**15. Commitments**

Commitments at December 31, 1994 for which no provisions have been made in these financial statements are as follows:

<u>Capital Project</u>	<u>1994</u>	<u>1993</u>
Contracted for West Bay Beach Sewerage Re-lining	100,500	-
Authorized but not contracted for -		
Lower Valley Reservoir and Pumping Station	700,000	-
Bodden Town Water Supply extension	-	500,000
	<u>\$800,500</u>	<u>\$500,000</u>