

THE PORTFOLIO OF DEVELOPMENT AND NATURAL RESOURCES

THE WATER AUTHORITY

1986 ANNUAL REPORT

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1.0 GENERAL

The year has seen great advances towards the provision of public sewerage systems and public water supplies for these islands. The West Bay Beach sewerage project got under way and at the end of the year construction had commenced on the main civil engineering contract. The George Town water supply project obtained the approval of the Water Authority and Government, the latter entering into an agreement with Central De-sal for them to produce desalinated water and sell it to the Water Authority for piped distribution. Construction of these works will commence in mid 1987, with water being distributed early in 1988. A ground water investigation was carried out on Cayman Brac, giving little encouragement as to the sufficiency of that resource to maintain a public supply.

During the year only three full Water Authority meetings were held. The members of the Authority are as follows:-

Chairman:	Member, Development and Nat. Res. Hon. V.G. Johnson CBE JP
Members:	Member, Commun., Works & Dist. Admin. Hon. C. Kirkconnell
	Financial Secretary Hon. T. Jefferson OBE JP
	Chief Engineer Mr. D. Ebanks
	Chief Environmental Health Officer Mr. P. Foye
	Mr. R. Flowers
	Mr. V. Jackson
	Mr. B. Watler
Secretary:	Director, Water Authority Mr. R. Beswick.

2.0 ADMINISTRATION

2.1 Staffing

The staff compliment is now as follows:-

a. Director	SS 4
b. Project Manager	AP 3-4
c. Hydrogeologist	AP 3-4
d. Water Supply Engineer (Design)	AP 3-4
e. Senior Superintendent (Water)	T 9
f. Senior Draughtsman	T 8
g. Junior Draughtsman	T 3-4
h. Junior Draughtsman	T 3-4
i. Laboratory Technician	T 3-4
j. Technician (Water)	T 3-4
k. Graduate Research Assistant	T 1
l. Accountant	T 7-8
m. Executive Officer	E 1-2
n. Clerical Officer	C 1-4
o. Associate Expert UN	No cost
p. Associate Expert UN	No cost
q. Plumber	D3
r. Mason	C3
s. Labourer	A3

The following staff movements took place during the year.

Staff leaving:

Mr Micheal Hislop, the Laboratory Technician, left in September to read Biology at the University of Sussex, UK.

Mr Christopher Hollander, who was employed in September to replace Mr Hislop, left in November to return to UK.

Staff recruited:

Mr Bunyan Whittaker was recruited in January to the position of junior draughtsman.

Mrs Mary Jane Bodden was recruited in March to take up the position of Accountant.

Mr David Powery was recruited in September to the position of Technician (Water).

Mr Don Ebanks was recruited in November as Laboratory Technician.

Mr Tjeerd Dijkstra was employed in March by the United Nations as an Associate Expert.

Staff placed on the Permanent Establishment:

Mr Thomas Hill in April.

Miss Kathy Seymour in January.

Mr Antoney Reid in January. (Presently studying in Miami on a two year UN Fellowship)

Miss Juliette Nicholas in September.

Contract Staff:

Mr R. Beswick's contract as Director was renewed in April for a period of two years.

Mr G. Anderson's contract as Project Manager was extended for a period of three months.

Mr A. Jones's contract as Water Supply Engineer (Design) was extended for a period of three months.

Mr G. Page's contract as Senior Draughtsman was extended for a period of three months.

✓ **2.2 Finance**

The following table details the 1986 allocation of funds, the actual expenditure that took place and the revenue earned.

EXPENDITURE	<u>RECURRENT EXPENDITURE</u>		
	<u>HEAD</u>	<u>ALLOCATION</u>	<u>EXPENDITURE</u>
01	Personnell Emoluments	347,225.00	312,199.51
02	Travelling & Subsistence	3,280.00	3,019.25
03	Supplies & Materials	18,800.00	14,579.24
04	Rent of Property	5,000.00	5,000.00
06	Utilities	20,000.00	15,647.24

	<u>HEAD</u>	<u>ALLOCATION</u>	<u>EXPENDITURE</u>
07	Other Operating Services	10,300.00	7,182.75
08	Grants, Contributions	5,000.00	5,000.00
12	Interdepartmental Purchases	45,000.00	44,018.15
14	Equipment	15,750.00	8,970.78
	TOTAL RECURRENT	470,355.00	415,616.92

CAPITAL EXPENDITURE

LOCAL CAPITAL FUNDS

41-024	Water & Sewerage Development	52,000.00	202,730.00
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Made up of:-

	Cayman Brac Water Resources Investigation		45,233.35
	West Bay Beach Sewerage Project		156,372.69
	George Town Water Supply		1,123.96

LOAN CAPITAL FUNDS

42-004	Water & Sewerage Development	2,914,000.00	2,193,653.16
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REVENUE

	<u>HEAD</u>	<u>ESTIMATED</u>	<u>ACTUAL</u>
63-005	Water Resources - Licences	12,000.00	14,375.05
63-011	Water Industry - Licences	5,000.00	3,415.00
64-010	Sale of Water	120,000.00	70,268.60
65-014	Inspection -Plumbing Fees	20,000.00	24,249.00
67-005	Royalties Dredging	-----	-----
67-008	Royalties Water	150,000.00	187,921.91
70-001	Other Receipts	1,000.00	5,612.06
	TOTAL REVENUE	308,000.00	305,841.62

FINANCIAL ANALYSIS OF LOWER VALLEY AND EAST END FACILITY COSTS

Revenue generated from water sales from these two facilities was CI\$74,797.27. This figures differs from revenue shown overleaf as the December accounts are not settled until January the following year.

The cost of water is CI\$1.45 per Cubic Metre and has remained unchanged since the commissioning of the works.

The operational and maintenance costs are:-

Administration	5,250.00
Labour	19,750.00
Electricity	15,647.00
Vehicle	9,800.00
Chemicals	619.00
Rent of site	5000.00
Spares	480.00
TOTAL OPERATIONAL COSTS	56,546.00

DEPRECIATION

Total cost of works	373,757.00
Civils part	315,424.00
Mechanical part	58,333.00

Civil works depreciated over 40 years, annual cost of CI\$7,885.60

Mechanical works depreciated over 10 years, annual cost of CI\$5,833.30

TOTAL DEPRECIATION COST = CI\$13,718.90

TOTAL COSTS, OPERATIONAL + DEPRECIATION = CI\$70,264.90

Surplus revenue over expenditure is therefore CI\$4,532.37 or approximately 1.2% return on the investment. No allowance has been made for principal or interest repayment.

2.3 Conferences and Seminars

The Graduate Research Assistant attended a UNESCO workshop in the Dominican Republic, held to prepare a Hydrogeological Atlas for the Caribbean.

The Graduate Research Assistant attended the Third Water Resource Congress held in St Thomas, US Virgin Islands.

The Director represented the Cayman Islands at a Tripartite review of the UN interregional conference held in Barbados.

2.4 Reports and Papers

The following reports and papers have been prepared during the year:-

The revised edition of the Technical Report for the First Phase of the George Town Water Supply.

The Caribbean Development Bank Appraisal report for the George Town Water Supply.

The document providing Central De-Sal with a Licence to produce and sell potable water to the Water Authority.

Tender documents for the procurement of Plant and Machinery for the George Town Water Supply.

The design document and drawings for the George Town Water Supply.

Probable impact of the Safehaven development on Ground water in the area.

Ground water conditions in Bowse Land as related to the proposed canalization for mosquito control.

Hydrogeological guidelines for the establishment of storm water drainage standards.

Disposal of effluent into brackish water aquifers on Grand Cayman with some recommended changes.

Construction of hydrogeologic test wells in the Bluff limestone on Cayman Brac.

Lower Valley Domestic Well monitoring - Spring 1986.

North Side Domestic Well monitoring - Summer 1986.

Interpretation of Hydrochemical Facies of Ground Water in Grand Cayman.

The hydrogeological Atlas for the Cayman Islands.

The following papers have been prepared in association with staff at the Water Authority:-

Anatomy of a Pleistocene Carbonate breccia formed by the collapse of seacliffs, Cayman Brac, British West Indies. Submitted to the Bulletin of Canadian Petroleum Geology, Canada.

The structure and diagenesis of rhizoliths from Cayman Brac, West Indies. Submitted to the Journal of Sedimentary Petrology, USA.

3.0 WATER RESOURCES

3.1 Monitoring

The comprehensive monitoring programmes established in 1985 for the major ground water resources of Grand Cayman have remained operational in 1986 with only minor adjustments to suit specific needs.

The following techniques are being used in the monitoring programme:-

- a. Observation open boreholes and piezometers, constructed on the Lower Valley and East End lenses, are monitored on a bi-weekly schedule. Water samples are also collected and analysed for main chemical composition in the laboratory.
- b. In Grand Cayman, seven continuous water level recorders and one tide gauge are presently in use throughout the area. One continuous water level recorder and one tide gauge have begun their recordings in September 1986 in Cayman Brac.
- c. A network of fifteen primary rain gauges provide island wide rainfall information.
- d. The quantity and quality of water drawn from all the production wells are measured on a weekly basis.
- e. Domestic wells in George Town, Lower Valley and East End continue to be monitored on a regular basis. This

domestic well monitoring programme has been extended to North Side in 1986 and is to include West Bay in 1987.

3.2 Cayman Brac Water Resources Investigation

During the period 22nd July to 7th August 1986, a total of eight exploratory/production wells were drilled along the new Lighthouse road on the Bluff. The drilling and testing results have been compiled and assessed. A comprehensive report detailing the findings and recommendations is in its final stage of preparation. One continuous water level recorder and a tide gauge have been installed in Cayman Brac to provide a continuous data base for further evaluation of the ground water resources.

3.3 Experimental Trench Well in Lower Valley

An experimental trench well has been designed and constructed at the Lower Valley reservoir site. The objective of this horizontal well is to study the possibility of improving the quality of the Lower Valley product water by abstracting water at or close to the water table. The well has been monitored closely and thus far the results are encouraging.

3.4 MRCU Canalization

Following the recommendation proposed by the Lower Valley Canalization report, MRCU has carried out some partial backfilling of the canal north of the Lower Valley lens. The affect of this partial blockage is being monitored by a continuous water level recorder. It is too early to draw any conclusions from the data collected.

A study has also been carried out for the proposed Bowse Land canalization. Several wells were drilled for monitoring purposes.

3.5 Water Testing Laboratory

The Laboratory continues to satisfactorily meet the needs of the department and to offer water testing facilities to the general public. The services provided by Mr Micheal Hislop, who is now attending university in UK, was most valued and his leaving has left a large gap. Presently the department employs Mr. Don Ebanks, another 'A' level student, who will be leaving next year to attend university. The laboratory is presently being geared up to handle the waste water analysis that will be required when the sewage treatment works is in operation. The cooperation with the Environmental Health department has continued through the year.

3.6 Research - Graduate Research Assistant

The doctorate research being carried out by the GRA, Mr Sam Ng, is progressing well. An advisory committee comprising Dr Brian Jones (Thesis advisor and carbonate sedimentologist), Dr Fred Longstaff (Geochemist) and Dr Frank Schwartz (Hydrogeologist) has been approved by the faculty of Graduate Studies and Research of the University of Alberta. Subsequently, Mr Ng's research topic - Diagenesis of the Tertiary Bluff Formation: a petrographic and hydrochemical approach - and thesis proposal have been approved by the committee as well founded to pursue as a doctorate dissertation.

In association with his professor, Dr Brian Jones, and with the logistic support provided by the Water Authority, geological research has been extended to Cayman Brac. Two research papers have been prepared from material collected from Cayman Brac. The papers have been submitted to reputed scientific societies for publication in their Journals.

3.7 Water Resources Licencing

In compliance with its Statutory obligation the Water Authority has approved and granted the following Licences and Permits during 1986.

Commercial ground water Licences	10 No.
Effluent discharge Permits	310 No.
Quarry Permits	2 No.
Canal Permits	3 No.

This is in addition to those that were granted during 1985.

Attempts to persuade Licence and Permit holders to renew on the annual anniversary of the grant of their Licence or Permit have been fairly unsuccessful and Executive Council is to consider amending the regulations to allow the grant of these Licences or Permits for an indefinite period.

The system has been computerized for data storage and retrieval. This facilitated the renewal process for those Licences granted in 1985.

3.8 Rainfall distribution

The 1986 average rainfall in Grand Cayman was 938 mm (36.9 inches), but is somewhat irregularly distributed over the island (see table below). Rainfall in the eastern part and the western peninsula continued its downward trend with a record low of 638mm at the West Bay station since recording

began in 1973.

As in previous years, the rainfall records showed a bimodal distribution with two distinct peaks occurring in May and October. Approximately 80% of the rain fell in May to June and August to November.

The following table shows the rainfall figures for 1985 and 1986. Data from the Britannia Club are not included because of incomplete records. All figures are in millimetres.

RAINFALL DATA

STATION	1985	1986	1986	1986	1986
	Annual Total	Annual Total	Monthly Average	Low Extreme	High Extreme
Driftwood Village	918	982	81.8	Apr: 6.0	May: 304.7
Little Bluff	1028	800	66.7	Mar: 5.5	May: 153.5
Tortuga Club	1501	934	77.8	Mar: 5.0	May: 153.6
Furtherland Farm	1131	969	80.8	Feb: 2.5	Oct: 215.8
East End Village	854	803	66.9	Feb: 0.0	May: 155.7
Frank Sound	869	838	69.8	Feb: 5.0	May: 176.2
Bodden Town	918	1062	88.5	Apr: 2.0	May: 250.8
Lower Valley	954	1038	86.5	Feb: 7.3	May: 260.6
Savannah	946	1026	85.5	Feb: 14.5	May: 202.5
North Sound Est	1230	1090	90.8	Mar: 22.4	May: 249.9
Prospect Park	1035	963	80.3	Feb: 24.2	May: 211.7
South Sound	955	1054	87.8	Apr: 10.5	Aug: 231.9
Airport	1256	933	77.8	Apr: 5.1	May: 227.8
West Bay	902	638	53.2	Mar: 3.1	May: 150.1
Island Wide Average	1036	938	78.1		

3.9 Consultancy Work:

The Government of Turks and Caicos requested assistance in carrying out a ground water resource investigation on the island of Providenciales. This two week consultancy was carried out by the Hydrogeologist and a report is in the process of being compiled. The cost of this work including an administrative on cost was met by a local developer in the Turks and Caicos.

Two operators from the Turks and Caicos Water Undertaking attended a two week water resources development and management workshop, established to address their particular needs. This workshop was sponsored by UNDP.

The total volume of water abstracted was 8,877.28 cubic metres (2,352,479 US Gallons).

The total volume of water sold to the truckers was 4,058.55 cubic metres (1,075,516 US Gallons).

The total volume of water taken from the public stand pipe was 71.10 cubic metres (18,840 US Gallons).

The loss in the pipeline was less than 1%. The loss in the reservoir was somewhat more and a small leak has been located. This leak will be sealed at the end of the 1987 dry season.

The quality of the product water remains excellent and has varied between 120 and 140 mg/l chlorides. No bacteriological contamination has been found.

The quantity of electricity used was 4,057 Kwhs which corresponds to a power consumption of 0.46 Kwh per cubic metre produced.

4.3 Cayman Water Company

It would appear that the Cayman Water Company had a substantially better year than 1985. The records submitted by the Water Company showed that 1986 sales had exceed those in 1985 by 17% to a record high of 149,849,589 US Gallons.

Annual production was - 160,455,730 US Gallons, of this 7% or 10,666,141 US Gallons were unaccounted for, 16% or 23,987,780 US Gallons were sold to the truckers and the remaining 125,861,809 US Gallons were sold on the pipeline.

The trucked water demand on the facility showed an increase over 1985 of 69% or 9,834,368 US Gallons. The trucked sales in 1985 represented 11% of total sales, in 1986 this percentage increased to 16%.

The maximum monthly sales took place in March and was 16,982,570 US Gallons, this represents 566,086 US Gallons per day or 83% of the rated capacity of the plant. The minimum monthly sales took place in June and was 9,342,230 US Gallons. The average monthly sales was 12,487,466 US Gallons, or 410,547 US Gallons per day. This average figures represents 60% of the rated capacity of the plant.

The maximum fuel adjustment factor was CI\$1.78 per 1000 US Gallons with a minimum of CI\$0.37, the average for the year was CI\$1.02. This followed closely the cost of fuel which varied from CI\$1.00 per 1 Gallon to CI\$0.63.

The present average cost of water to the pipeline customer is CI\$18.47 per 1000 US Gallons. The truckers pay CI\$16.02 per 1000 US Gallons.

4.0 WATER SUPPLY

4.1 Lower Valley Wellfield Facility

Lower Valley wellfield completed its third full year of operation.

Rationing of the supply was necessary between 16th March to 20th May.

At the year end 18 production wells were in operation, including one new, experimental trench infiltration well. The total pumping capacity of the wellfield is 33.87 US Gallons per minute or 48,773 US Gallons per day. This is reduced from the previous year. The reduction has been made in order to protect the resource during a period of below average rainfall, a policy which is in-line with the statutory obligations of the Authority.

The total volume of water abstracted was 59,146.24 cubic metres (15,673,754 US Gallons).

The total volume of water sold to the truckers was 55,716.05 cubic metres (14,764,753 US Gallons). This represents an increase of 1,092.76 cubic metres over 1985, or 2%.

Allowing for storage and pump testing the water loss from the pipeline was 5%.

Demand for water during the year followed the rainfall distribution; sales varying from a low of 2,316.96 cubic metres in June to a high of 6,791.64 cubic metres in April.

The quality of the product water remained fairly constant throughout the year, ranging between 350 and 450 mg/l chlorides. No bacteriological contamination was found.

The quantity of electricity used was 119,649 KwHs, which corresponds to a power consumption of 2.02 KwHs per cubic metre of water abstracted.

4.2 East End Wellfield Facility

East End wellfield completed its first full year of operation.

The demand on the facility has not been great. The ten production wells have remained in operation.

The total pumping capacity of the wellfield is 65.11 US Gallons per minute or 93,758.4 US Gallons per day.

The Company was granted a variation to its Capital Contribution Scheme, whereby the contribution for a hotel room has increased to US\$850 per room, for an apartment to US\$975. The sheme is now applicable to commercial accommodation and is levied at US\$350 per 1000 sq feet of floor area. The 10% interest repayable by the company has been removed and now the Company is only required to repay the contribution by way of a 10% discount on the water bill.

Within the Water Company franchise area two hotels have opted to provide their own water supply utilizing seawater reverse osmosis. The Hyatt Hotel has provide a Culligan hollow fibre plant of 160,000 US Gallons per day and the Treasure Island Hotel an Aqua Design spiral wound plant of 60,000 US Gallons per day. The former plant has been operational since 1985 with varying degrees of success and the latter was commissioned in December.

4.4 Water Truckers

Seven trucker draw water from Lower Valley and five from East End. All seven truckers use the Cayman Water Company, whilst one of the truckers uses private wells situated on Walkers Road.

The total quantity of water drawn by truckers was as follows:-

Water Company	23,987,780 US Gallons
Lower Valley	15,673,754 US Gallons
East End	1,075,516 US Gallons
Walkers Road	<u>.1,904,347 US Gallons</u>
TOTAL	42,641,397 US Gallons

This equates to a daily trucked demand of 116,826 US Gallons.

This represents a 22% or 7,765,098 US Gallon increase over 1985.

4.5 George Town Water Supply

A good deal of the year was taken up with prolonged negotiations between the Government and the Caribbean Utilities Company to come to a mutually satisfactory agreement for CUC to produce distilled water using waste heat from its engines. Following the submission in mid year of a proposal to Executive Council it was decided by Exco to establish a committee to continue negotiations with CUC.

This Committee was made up of all the Members of Exco, with the exception of the Governor and the Chief Secretary.

The negotiations resulted in the granting of a Licence on 20th November to a company established by CUC to produce water. The new company was to be called Central De-Sal. The Licence gave authority to CDS to produce water upto a quantity of 380,000 (456,000 US Gallons) Imperial Gallons per day. It does not provide CDS with a franchise, the Government is entitled to obtain additional water from any source it seems fit.

Briefly the Licence requires that CDS provide a plant capable of producing 450,000 Imperial Gallons per day. That this plant is capable of efficiently utilizing the waste heat available from the diesel engines operating at CUC and that the plant is to be approved by the Water Authority. The Licence is granted for a period of 15 years, the Government has contracted the Water Authority to purchase 150,000 IGallons per day in the first year increasing gradually to 380,000 IGallons per day in year five and for each year until the end of the Licence. The selling price of water is fixed at US\$12.50 per 1000 IGallon (CI\$8.00 per 1000 US Gallons) for the first five years. In year six the selling price will be determined using a strictly controlled rate base calculation. Projections show that in year six the price will be reduced to the minimum of US\$12.25 per 1000 IGallons (CI\$7.80 per 1000 US Gallons). This minimum price is based on financing costs available at the time, the provision of better terms will result in a reduction in the minimum price.

The Licence requires that CDS meet the water demand of the Authority up to the capacity of the plant provided, additional water demand could be provided by CDS but on terms to be agreed with the Government, after considering the economics of other possible options.

The Water Authority will be responsible for the piped distribution of the water. The design of the first phase of the distribution has been completed, funding of CI\$1,479,000 has been offered by CDB and the Loan Agreement is scheduled to be signed before the end of January 1987. The total cost of the first phase is estimated to be CI\$1,980,000.

CDB advertising procedures were implemented to select suppliers of plant and materials and civil engineering contractors. Tender documents for the procurement of the plant and materials were distributed in December, the closing date is 4th February 1987. A contract is expected to be let soon after that date. The Authority will purchase all the materials and hand them over to the contractor to carry out the works. This will result in the saving of any profit the contractor would normally place on material purchase.

Civil Engineering contractors will be prequalified following the closing date of 16th February 1987. The contract documents for the civil work will be issued soon after that date and it is intended to commence the contract in July 1987, with a completion date early in 1988. This will coincide with the date CDS is contracted to produce water.

At this stage it is anticipated that water will be sold to the truckers for a cost of CI\$12.00 per 1000 US Gallons, to the pipeline at varying costs ranging from CI\$13.00 to CI\$15.00 per 1000 US Gallons. All water will be metered to each consumer.

The reservoir site will be located on Government land just east of the Government Central Funding Scheme.

The Cayman Water Company initially declined a Government request to become involved in the supply of water to George Town. The Company later came back with an offer to sell water to the Water Authority for CI\$13.00 per 1000 US Gallons.

4.6 Miscellaneous

The Water Authority has assumed responsibility for the operation and maintenance of the chlorination of water supplies at various Government Buildings. The Public Works Department continues to purchase the chemicals and spare parts for the equipment. Water Authority staff monitor the treatment on a weekly basis and keep records for the Public Works Department and the Environmental Health Department.

A considerable amount of time has been spent on the Prison water supply and it is hoped that the problems there will be resolved in 1987.

5.0 SEWERAGE

5.1 West Bay Beach Sewerage Project

The West Bay Beach Sewerage project received the approval of the Government in 1985. A US\$7,000,000 loan was signed with the Caribbean Development Bank in December 1985.

Consultants, Camp, Dresser and McKee were employed in January 1986 to assist with project evaluation and construction supervision.

The construction of the project was facilitated by three contracts. The first being the preliminary filling of the

sewage treatment works, the second the procurement of all plant and material and the third the civil engineering contract.

In respect to these three contracts the following was carried out during the year:-

Preliminary filling of the sewage treatment works contract

- a. The contract was let to Hawk Enterprises on 20th January 1986. Work commenced on the works in March.
- b. The tender price of CI\$651,352.57 was subsequently renegotiated to CI\$497,997.37. This negotiation was based on allowing the contractor to purchase fill from the Airport Runway works.
- c. The estimated quantity of fill was 32,000 cubic metres. This estimate was low and eventually 50,294.43 cubic metres were required to complete the works. Of this quantity Hawk provided 45,517 cubic metres, the remaining 4,777.43 cubic metres were provided and placed by the Water Authority. This was carried out after Hawk was unable to continue with the contract. The works were completed in November.
- d. The final cost of the Hawk contract was CI\$607,690.86, the Water Authority cost of completing the works was CI\$49,988.28, the cost of pre-contract preliminary works was CI\$17,641.37, therefore the total cost of the works was CI\$675,314.51.

Procurement of Plant and Materials Contract

This contract was let to Ramsen Engineering of Canada for a tender price of CI\$958,000.00. The contract was signed on 15th July 1986. The major shipment of pipes and manhole sections arrived in early October. The remaining parts of the contract are to be delivered in early 1987.

Civil Engineering Contract

- a. The contract was let to Hadsphaltic International Limited of Grand Cayman for a tender price of CI\$6,301,458.68. The contract was signed on 7th October and work commenced on 24th November.
- b. At the end of the year the progress on the contract had been poor and the ability of the contractor gave no confidence. The contractor performance in the early

part of 1987 will be closely monitored and decisions as to what action is to be taken will be made at that time.

EXPENDITURE ON THE PROJECT UP TO THE END OF 1986

<u>PART COSTED</u>	<u>LOCAL FUNDS</u>	<u>LOAN FUNDS</u>
Project Design and Management	271,880.00	
Consultants	50,400.00	
Sewage Treatment Works		
Hawk Contract		605,690.86
Water Authority works	67,623.65	
Procurement of Materials		958,000.00
Civil Engineering contract		625,633.23
Loan Charges		
Commitment Fee	52,306.80	
Interest	14,247.97	
Letter of Credit charges		4,329.07
Land Purchase	240,000.00	
Miscellaneous	<u>26,300.79</u>	
TOTAL COSTS	722,758.61	2,193,653.16

LIST OF EVENTS THAT WERE CARRIED OUT TO FACILITATE THE WEST BAY BEACH PROJECT

1	Civil engineering contractors prequalification list from CDM	19/3/86
2	Materials and Plant Procurement Tenders issued	21/3/86
3	List of proposed qualified civil engineering contractors to CDB for approval	24/3/86
4	Civil engineering contract draft conditions of contract to CDM for comment	27/3/86
5	Civil engineering contract draft conditions of contract to CDB for approval	27/3/86
6	CDB approval of qualified civil engineering contractors list	16/4/86
7	Civil engineering draft specifications to CDM for comment	28/4/86
8	Civil engineering contract bill of quantities to CDM for comment	28/4/86

9	All contract drawings to CDM for comment	15/5/86
10	Civil engineering contract documents to CDB for approval	20/5/86
11	Return of Materials and Plant procurement tenders	28/5/86
12	Opening of materials and plant procurement tenders	29/5/86
13	Authority review and recommendations of award for procurement contract	30/5/86
14	CDM final review and acceptance of overall project	2/6/86
15	PTB acceptance of procurement tender as recommended	6/6/86
16	CDB approval of civil engineering contract documents	9/6/86
17	Exco acceptance of procurement tenders as recommended by PTB	19/6/86
18	CDB approval of procurement tender acceptance	20/6/86
19	Issue civil engineering tender documents to six contractors	26/6/86
20	Award of procurement contract by Government	15/7/86
21	Civil engineering tender conference held in Cayman	22-23/7/86
22	Return of civil engineering tenders to PTB	28/8/86
23	PTB opening of civil engineering tenders	28/8/86
24	Submission of review and recommendation of award for civil engineering tender to PTB	11/9/86
25	PTB acceptance of civil engineering tender	18/9/86
26	Exco acceptance of PTB recommendation for civil engineering contract	23/9/86
27	CDB approval of proposed award of civil engineering contract	1/10/86
28	Completion of first portions of procurement contract	7/10/86
29	Completion of second portions of procurement contract	14/10/86
30	Award of civil engineering contract	7/10/86
31	Civil engineering contract commenced	24/11/86

5.2 George Town Sewerage Project

The Canadian International Development Agency provided approximately Can\$200,000 of grant aid for a Canadian Consultant to carry out a pre-feasibility study into the provision of a sewerage system for George Town, utilizing

the relatively new technique of small bore sewerage. The consultants that were employed were Co-Water International of Ottawa.

The Consultants carried out four weeks of field work in October, where they collected data to carry out a preliminary design and also carried out some work to determine the residents attitude to a piped sewerage system.

The Consultants are scheduled to make two more visits to the island next year, when they will present their preliminary report and assist with the setting up of the accounting system.

Small bore sewerage is a system whereby only the liquid fraction of the sewage is transported by pipeline to the sewage treatment works. The solids are allowed to remain in the existing septic tank or where none exists or is unsatisfactory, then one would be provided. De-sludging of the septic tank will be required on four yearly cycles, this operation will be carried out by the Water Authority. The advantage of this system is that smaller and shallower pipes can be utilized, thereby reducing costs and disruption.

The preliminary consultants report will be submitted to the Water Authority at the time it is available, which should be in the middle of March 1987.

6.0 WATER AND SANITATION OPERATORS

Following the first full year of providing various categories of operators with licences, the following Licences had been issued at the end of 1986.

Apprentice Plumbers	- 17 No.
Journeyman Plumbers	- 69 No.
Master Plumbers	- 17 No.

Septic Tank emptiers	- 4 No.
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Well Drillers	- 3 No.
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The Plumbers Examination Board comprising the Chief Environmental Health Officer (Chairman), the Executive Engineer (Mechanical and Electrical) PWD, the Senior Superintendent Water Supply and Mr Delano Hislop met on five occasions.

7.0 DEVELOPMENT CONTROL

A total number of 286 applications were made for plumbing approval. All these applications were granted subject to some modifications made in the interests of good plumbing.

All applications which were commenced in the year were inspected on at least two occasions during the construction period. The most notable approvals were the Hyatt Hotel and Treasure Island Hotel, both these developments required considerable on-site work.

The system continues to function well and a great deal of improvement in the design and construction of plumbing facilities has been observed over the short period this system has been in force.

The office has assisted in the preparation of the Building Code, the Economic Development Plan and the Physical Development Plan which is now on-going.

B.0 UNITED NATIONS

The Authority continues to benefit from being part of the United Nations Smaller Islands Water Resources and Management Project.

The Chief Technical Advisor, Mr P. Hadwen was replaced midway through the year by Mr B. Clements, who made one visit to the Island.

The Authority continues to participate on a 100% cost sharing basis, the 1986 cost was CI\$5,000.00.

A replacement Associate Expert was appointed in January, Mr TJeerd Dykstra replaced Mr Leonardus de Waal who left during 1985.

Computer equipment was purchased, this being a third Apple 2E computer and various ancillary equipment including two printers and a hard disc and an IBM computer with software to be utilized for the accounting system. A software expert will be available early in 1987 to provide expertise and custom made software for the accounting system.

Mr Antony Reid completed the first year of his two year UN fellowship. Mr Reid is studying an engineering technicians course at Dade Community College. Arrangements have been made for Kathy Seymour to attend WACO college in Texas on a similar course, sponsored by a second UN two year fellowship. Ms Seymour will commence her studies in the middle of 1987.